

ANNUAL REPORT

OF THE

DEPARTMENT OF THE INTERIOR

FOR THE

Fiscal Year ended March 31, 1920

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

THOMAS MULVEY

PRINTER TO THE KING'S MOST EXCELLENT MAJESTY

1920.

*To His Excellency the Duke of Devonshire, K.G., P.C., G.C.M.G., G.C.V.O., etc., etc.,
Governor General and Commander in Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

The undersigned has the honour to lay before Your Excellency the report of the transactions of the Department of the Interior for the fiscal year ending March 31, 1920.

Respectfully submitted,

A. MEIGHEN,
Minister of the Interior.

OTTAWA, August 5, 1920.

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REPORT

OF THE

DEPARTMENT OF THE INTERIOR

1920

Hon. ARTHUR MEIGHEN, K.C., M.P.,
Minister of the Interior,
Ottawa.

I have the honour to submit the 47th Annual Report of the Department of the Interior for the twelve months ending March 31, 1920.

The reservation of the most desirable homesteading lands for soldier settlement has kept down the number of entries granted to civilians, but nevertheless the amount of land business transacted is very satisfactory and it is anticipated that with the rapid completion of the work of settling returned soldiers upon the land the reservations will be discontinued at an early date and the lands then made available will be taken up rapidly by incoming settlers and by those at present resident in cities who desire to take up farming and are not willing to go any distance from established settlements.

Owing to the fact that free homesteading land immediately adjacent to transportation facilities was not available, private owners were enabled to dispose of a great deal of desirable farm land. In this they were assisted by our Natural Resources Intelligence Branch, who prepared a list of unoccupied land giving the names of the owners. These lists were widely distributed and resulted in a great many farms being procured by those who were able to pay for them.

The reported discovery of oil in the Mackenzie district of the Northwest Territories means that we may expect a rapid influx to the far north, and the department is now formulating regulations whereby the resources of the Northwest Territories may be developed along lines that are in the best public interest and at the same time endeavour to protect the welfare of the native population and the animal life of those districts.

The educational work of our Parks Branch is bearing fruit and we have to report a very gratifying influx of American tourists. Each and all are enthusiastic about the advantages of our national parks, and it is confidently expected that the movement which has been established will be a permanent asset.

The increasing price of coal to the Canadian consumer has focussed the public eye upon our water-power resources, their availability for economic development and more extensive utilization.

Immediately following you will find a brief synopsis of the work of the various branches which has been prepared as a preface to the more detailed statements submitted by the head of each branch.

11 GEORGE V, A. 1921

STATEMENT of Gross Cash Receipts Received from all Sources during the Fiscal Year ended March 31, 1920, compared with the Receipts for the previous Fiscal Year.

Source of Revenue.	1919-20.	1918-19.	Increase.	Decrease.	Net Decrease.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Dominion Lands.....	4,738,840 85	3,615,958 52	1,122,882 33		
School Lands.....	3,900,091 75	5,087,875 81		1,187,784 06	
Ordinance Lands.....	9,840 33	4,819 27	5,021 06		
Seed Grain.....	1,155,354 64	1,378,275 76		222,921 12	
Casual Revenue.....	22,837 87	12,381 71	10,456 16		
Registration fees—Yukon.....	430 78	789 22		358 44	
Fines and forfeitures.....	60 00		60 00		
Fines and forfeitures—N.W.T.....	10 00	35 00		25 00	
Sales of land—special account.....	75,255 00	239,075 10		163,820 10	
	9,902,721 22	10,339,210 39	1,138,419 55	1,574,908 72	436,489 17

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STATEMENT of Cash Receipts on account of Dominion Lands Revenue for the Fiscal Year ended March 31, 1920, as compared with the Receipts for the previous Fiscal Year.

Particulars.	1919-20.	1918-19.	Increase.	Decrease.	Net Increase.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Homestead fees.....	67,460 00	42,190 00	25,270 00		
Improvements.....	77,807 94	48,665 97	29,141 97		
Pre-emption sales under Act, 1908...	2,415,322 26	1,899,359 52	515,962 74		
Purchased homestead sales.....	132,738 49	150,063 46		17,324 97	
General sales.....	201,247 33	131,881 45	69,365 88		
Sale fees.....	120 00	170 00		50 00	
Map sales, office, fees, etc.....	17,134 19	11,039 54	6,094 65		
Rental of land.....	15,455 17	19,302 85		3,847 68	
Survey fees.....	18 68	48,287 00		48,268 32	
Timber dues.....	589,780 21	408,728 28	181,051 93		
Grazing rental.....	183,661 96	148,179 55	35,482 41		
Grazing lands, improvements.....	1,105 80	560 00	545 80		
Coal lands.....	361,947 48	375,895 14		13,947 66	
Hay permits.....	36,362 19	22,085 06	14,277 13		
Mining fees.....	62,255 08	52,342 25	9,912 83		
Hydraulic leases.....	2,265 00	4,393 72		2,128 72	
Dredging leases.....	1,958 97	1,745 10	213 87		
Export tax on gold.....	41,463 84	48,677 07		7,213 23	
Free certificates for export of gold...	8 00	10 50		2 50	
Stone quarries.....	8,717 12	8,221 59	495 53		
Rent of water-power.....	3,661 18	1,452 32	2,208 86		
Sand, stone and gravel.....	541 45	1,104 44		562 99	
Petroleum.....	370,482 67	107,230 41	263,252 26		
Potash leases.....	1,316 37	3,906 10		2,589 73	
Irrigation fees.....	540 50	483 87	56 63		
Irrigation sales.....	50,297 01	11,556 38	38,740 63		
Fees re Board of Examiners, D.L.S..	255 00	100 00	155 00		
Patent and interchange fees.....	220 00	190 00	30 00		
Suspense account.....	6,725 88	6,837 93		112 05	
Interim receipt account, Yukon.....		15 00		15 00	
Forestry branch—sale of trees, etc..	4,012 55	2,604 17	1,408 38		
Fishing permits.....	881 00	824 00	57 00		
Miscellaneous.....	6,335 46	2,849 13	3,486 33		
Rocky Mountain park	48,330 58	46,978 49	1,352 09		
Jasper park.....	21,227 93	4,285 91	16,942 02		
Waterton Lakes park.....	3,848 42	1,992 95	1,855 47		
Yoho park.....	828 45	1,074 38		245 93	
Buffalo park.....	1,949 55	145 95	1,803 60		
Elk Island park.....	16 00	10 25	5 75		
Glacier park.....	18 50	43 22		24 72	
Moose Mt. Buffalo reserve.....	35 60	102 40		66 80	
Antelope park.....	409 60	195 20	214 40		
Fort Anne park.....	47 00	116 37		69 37	
Point Pelee park.....	30 44	31 60		1 16	
Revelstoke park.....		20 00		20 00	
Bird sanctuaries, Lac la Biche.....		10 00		10 00	
Refunds.....	4,738,840 85	3,615,958 52	1,219,383 16	96,500 83	1,122,882 33
	116,249 03	76,031 02	40,218 01		40,218 01
	4,622,591 82	3,539,927 50	1,179,165 15	96,500 83	1,082,664 32

In addition to \$201,247.33 on account of general sales, the department received \$75,255.00 from sales of railway lands, which sum, as provided for by Orders in Council, has been credited to special accounts in the books of the Finance Department.

STATEMENT showing receipts on Account of Dominion Lands from July 1, 1872 to March 31, 1920.

Fiscal Year.	Homestead Fees.	Pre-exemption Fees.	Improve-ments.	SALES.		Map Sales, Office and Registration Fees, etc.	Dominion Lands Surveyors' Examination Fees.	Rents, Survey Fees, Miscellaneous, including Trust Account.	Purchased, Homestead Inspection, Cancellation and Sundry Fees.	Timber Dues.
				Cash.	Scrp.					
1872-73.....	\$ cts. 6,960 00	\$ cts.	\$ cts.	\$ cts. 19,170 20	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts. 109 25
1873-74.....	7,310 00	.....	.....	19,834 75	.....	.....	.....	125 50	.....	2,710 55
1874-75.....	11,510 00	.....	.....	13,666 90	.....	129 00	.....	.....	.....	2,335 25
1875-76.....	4,680 00	.....	.....	3,478 94	320 00	.....	.....	.....	.....	387 00
1876-77.....	2,250 00	.....	.....	1,085 86	136,955 16	4 00	.....	100 00	40 00	320 00
1877-78.....	14,540 00	.....	.....	2,794 86	120,159 54	.....	180 00	.....	290 00	1,620 00
1878-79.....	17,690 00	.....	.....	4,998 39	210,904 84	81 00	310 00	13 70	410 00	325 00
1879-80.....	41,255 00	10,241 43	.....	45,708 97	81,685 86	245 40	580 00	183 25	1,780 00	25,121 46
1880-81.....	20,450 00	10,801 75	269 00	71,170 17	70,828 30	985 40	420 00	37 58	.....	32,028 34
1881-82.....	54,155 00	39,843 90	1,758 00	1,240,328 27	50,590 84	3,036 45	890 00	58 10	.....	58,753 14
1882-83.....	73,015 00	54,725 00	7,114 91	516,092 21	33,638 40	3,109 50	890 00	501 77	0 45	90,066 46
1883-84.....	41,580 00	28,810 00	2,596 11	424,863 36	40,919 67	1,289 55	530 00	45,766 53	1,713 00	147,983 10
1884-85.....	25,645 00	17,100 00	2,328 75	199,275 32	45,875 60	1,621 82	370 00	50,068 57	2,685 00	87,474 99
1885-86.....	26,110 00	14,371 00	1,101 50	76,140 41	214,657 97	1,339 34	360 00	20,070 00	5,025 40	64,820 31
1886-87.....	19,614 00	6,887 93	1,971 55	48,175 76	337,640 19	1,171 39	240 00	44,561 00	7,778 53	65,111 74
1887-88.....	23,691 00	4,830 00	1,918 35	52,238 36	313,522 67	1,660 75	240 00	20,591 41	12,078 50	94,964 55
1888-89.....	39,460 00	10,550 00	4,128 48	57,513 16	318,238 47	1,410 16	220 00	10,389 57	20,402 50	90,290 00
1889-90.....	35,920 00	8,580 00	3,250 54	54,896 85	228,744 47	2,099 07	190 00	3,316 23	20,232 50	84,642 95
1890-91.....	29,164 10	.....	6,302 61	91,664 98	171,425 14	1,854 78	88 00	7,951 05	14,712 50	102,902 71
1891-92.....	46,994 00	.....	6,472 31	108,901 01	97,822 41	2,147 31	135 00	29,898 49	23,104 00	106,461 35
1892-93.....	37,689 74	.....	7,113 50	93,671 67	77,231 18	975 20	82 00	18,509 35	22,014 00	105,865 24
1893-94.....	36,462 26	.....	3,497 76	53,254 71	27,840 96	973 11	40 00	13,457 09	11,097 90	81,290 51
1894-95.....	29,664 88	.....	3,567 90	37,293 71	23,269 62	695 99	.....	6,271 77	6,566 50	74,079 20
1895-96.....	18,278 00	.....	3,163 15	46,373 98	46,929 65	610 78	50 00	21,679 31	6,810 50	61,923 47
1896-97.....	21,179 00	.....	3,737 01	49,335 53	16,929 38	795 05	70 00	19,421 98	8,527 00	68,992 82
1897-98.....	34,780 00	.....	5,649 63	80,178 64	28,918 14	1,987 40	10 00	21,242 66	10,042 50	119,313 78
1898-99.....	58,235 00	.....	4,297 62	116,598 35	21,307 58	1,262 05	20 00	75,085 95	13,549 00	155,360 63
1899-1900.....	72,690 00	.....	4,835 81	103,247 58	88,756 22	1,258 85	190 00	38,072 54	14,937 00	126,345 82
1900-1901.....	79,910 00	.....	5,213 22	40,360 93	326,270 03	3,874 14	165 00	70,970 54	12,722 00	209,399 32
1901-1902.....	144,425 00	.....	8,481 46	66,950 21	169,767 13	5,792 96	370 00	71,997 30	663 00	207,790 90
1902-1903.....	320,409 65	.....	11,829 08	155,507 59	158,452 66	5,911 96	365 00	125,158 56	595 00	470,916 93
1903-1904.....	255,772 36	.....	15,119 47	196,750 15	188,424 22	5,519 13	463 50	81,550 46	1,081 00	397,344 33
1904-1905.....	304,806 25	.....	21,571 25	154,128 04	19,644 59	4,879 13	906 50	144,924 31	1,205 00	266,951 46
1905-1906.....	417,834 25	.....	31,795 19	442,588 69	7,654 57	6,042 31	474 00	141,948 55	1,976 25	292,684 53
1906-1907 (nine months).....	215,449 55	.....	39,763 63	494,117 12	11,349 89	5,449 06	420 00	69,536 31	1,089 51	379,476 32
1907-1908.....	301,693 73	.....	71,139 47	656,303 03	92,311 24	7,727 29	690 00	148,914 00	1,283 50	473,608 94
1908-1909.....	389,039 00	141,550 15	70,928 86	951,142 28	20,136 27	7,296 55	1,040 00	75,596 96	9,946 50	269,837 52

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1909-1910.....	415,232 00	174,250 00	105,009 07	1,239,037 33	9,973 84	9,135 49	1,577 10	100,257 89	14,028 30	378,010 70
1910-1911.....	445,135 00	156,485 00	143,227 13	1,193,756 04	1,437 84	8,730 01	1,310 00	42,111 92	20,142 85	387,054 96
1911-1912.....	391,703 12	102,070 00	184,825 92	1,967,182 85	3,256 99	11,239 14	1,400 00	44,167 03	14,745 50	400,668 61
1912-1913.....	337,055 00	85,940 00	168,904 42	1,650,491 87	6,157 27	14,483 91	1,040 00	17,866 65	11,380 00	463,738 75
1913-1914.....	317,412 00	61,660 00	187,052 46	1,279,223 51	240 00	16,056 07	1,350 00	40,148 65	8,402 00	378,365 33
1914-1915.....	238,295 00	28,720 00	114,982 17	691,122 56	80 00	14,290 23	970 60	33,234 14	4,776 10	310,934 29
1915-1916.....	170,350 00	22,760 00	112,782 70	1,073,970 21	.....	11,485 83	470 00	19,495 98	3,475 00	378,960 68
1916-1917.....	112,110 20	14,690 00	112,711 33	2,707,203 99	332 61	13,976 95	560 00	21,212 91	2,910 00	429,403 09
1917-1918.....	83,180 00	7,870 00	89,371 59	3,046,091 55	131 47	12,066 22	250 00	26,513 84	2,200 00	482,006 25
1918-1919.....	42,190 00	.....	49,225 97	2,192,860 81	323 41	11,039 54	100 00	77,291 91	360 00	408,728 28
1919-1920.....	67,460 00	.....	78,913 74	2,799,605 09	80 00	17,134 19	255 00	28,535 19	340 00	589,780 21
Total.....	5,900,434 09	1,002,736 16	1,697,922 62	26,630,646 75	3,821,136 39	222,903 49	20,281 70	1,828,806 50	316,118 29	9,427,261 02

STATEMENT showing receipts on account of Dominion Lands from July 1, 1872 to March 31, 1920.

Fiscal Year.	Grazing Lands.		Hay, Coal, Mining, Stone Quarries, Export Tax on Gold, etc.		Canadian National Park.	Colonization Lands.		Gross Revenue.	Refunds.	Net Revenue.
	Scrip, etc.		Scrip.			Cash.	Scrip.			
	\$	cts.	\$	cts.						
1872-73.....								\$ 26,239 45	\$ cts.	\$ 26,239 45
1873-74.....								29,980 80		29,980 80
1874-75.....								27,641 15		27,641 15
1875-76.....								8,865 94		8,865 94
1876-77.....								140,755 02		140,755 02
1877-78.....								139,584 40		139,584 40
1878-79.....								234,732 93		234,732 93
1879-80.....								206,801 37	4,636 08	202,165 29
1880-81.....								206,990 54	5,038 22	201,952 32
1881-82.....	2,245 00		40 00					1,805,734 87	10,687 55	1,795,047 32
1882-83.....	22,844 43		913 91					1,051,403 60	8,746 05	1,042,657 55
1883-84.....	11,370 60		640 90					1,001,776 67	9,220 50	992,556 17
1884-85.....	17,089 75		815 63					451,564 65	12,070 85	439,493 80
1885-86.....	29,562 51	3,131 08	1,284 83					457,973 95	13,389 12	394,584 83
1886-87.....	14,242 77	39,487 67	1,570 40	80 00				588,532 80	19,543 16	568,989 64
1887-88.....	5,922 47	23,023 28	2,273 73	80 00				569,986 68	6,277 66	563,709 02
1888-89.....	2,207 69	16,802 63	3,946 55					594,088 04	5,226 23	588,861 81
1889-90.....	1,305 57	9,021 63	9,242 08					462,536 26	8,209 74	454,326 52
1890-91.....	3,079 55	16,193 77	8,628 44	160 00				460,990 76	7,195 27	453,795 49
1891-92.....	3,726 80	17,222 60	5,616 85					452,151 08	15,291 39	436,859 69
1892-93.....	6,380 80	11,542 39	6,266 13					392,324 43	18,314 97	374,009 46
1893-94.....	5,740 79	7,687 86	6,243 15					250,069 12	4,544 01	245,525 11
1894-95.....	5,353 72	8,628 00	5,229 54					202,983 10	4,365 99	198,617 11
1895-96.....	7,071 86	6,255 90	5,813 51					227,694 93	8,368 79	219,326 14
1896-97.....	4,715 01	2,500 00	8,518 18					206,853 57	15,010 54	191,843 03
1897-98.....	4,728 58	510 39	699,334 76					1,009,741 63	4,678 55	1,005,063 08
1898-99.....	5,245 88		1,130,371 60					1,584,328 32	32,296 39	1,552,031 93
1899-1900.....	8,382 86	4,083 30	1,038,195 42	20 00				1,503,743 00	23,062 28	1,480,680 72
1900-1901.....	4,726 28	14,671 99	1,101,808 33	20 00				1,874,159 09	18,368 85	1,855,790 24
1901-1902.....	7,292 46	8,409 27	737,878 43					1,432,679 25	27,165 55	1,405,513 70
1902-1903.....	13,913 33	15,041 33	687,722 05					1,890,886 83	21,519 84	1,869,366 99
1903-1904.....	19,790 27	15,202 15	495,579 18					1,681,824 70	36,721 48	1,645,102 95
1904-1905.....	36,145 32	5,237 36	364,923 59					1,339,382 35	25,786 90	1,313,595 45
1905-1906.....	51,583 89	80 00	296,769 19					1,709,315 28	33,418 36	1,685,896 92
1906-1907 (nine months)	43,711 91	400 00	213,852 59					1,490,503 31	35,117 75	1,455,385 83
1907-1908*	43,211 78	4,048 01	266,415 31					2,094,579 17	115,080 04	1,979,499 13
1908-1909.....	53,312 79	3,257 84	252,972 17					2,277,678 09	102,463 78	2,175,214 31
1909-1910.....	67,434 29	5,081 47	460,154 29					3,022,446 13	121,431 15	2,901,014 98

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1910-1911.....	60,702 80	2,356 00	774,569 27	3,306,073 41	198,689 47	3,107,383 94
1911-1912.....	69,519 41	1,520 00	729,240 42	3,978,036 73	197,631 35	3,780,405 38
1912-1913.....	79,412 76	.....	779,695 53	1,587 32	.....	3,655,202 20	246,105 26	3,409,096 94
1913-1914.....	84,926 15	320 00	889,863 15	.....	.....	3,313,819 65	277,309 33	3,036,510 32
1914-1915.....	101,710 58	490 00	1,600,455 09	.....	.....	3,177,866 73	317,764 75	2,860,101 98
1915-1916.....	118,995 02	160 00	493,280 97	.....	.....	2,443,639 92	143,942 57	2,299,697 35
1916-1917.....	128,341 50	.....	600,934 13	.....	.....	4,190,238 16	134,243 14	4,055,995 02
1917-1918.....	125,300 69	240 00	634,027 95	.....	.....	4,557,810 08	113,680 44	4,444,129 64
1918-1919.....	148,179 55	.....	630,975 74	.....	.....	3,616,281 93	76,031 02	3,540,250 91
1919-1920.....	183,661 96	.....	896,413 40	.....	.....	4,738,920 85	116,249 03	4,622,671 82
Total.....	1,603,049 38	242,515 92	15,758,876 39	1,947 32	857,461 08	70,087,412 92	2,644,898 40	67,442,519 52

STATEMENT showing yearly the gross revenue (in cash only) received from all sources from July 1, 1900, to March 31, 1920.

Fiscal Year.	Dominion Lands.	School Lands.	Seed Grain.	Ordnance Lands.	Fines and Forfeitures.	Registration Fees.	Casual Revenue.	Chinese Immigration Revenue.	Total.
	\$ cts.	\$ cts.	\$ cts."	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1900-1901	1,533,197 07	48,049 83	15,711 63	14,604 47	1,977 96	33,979 77	1,587 57		1,649,108 30
1901-1902	1,254,333 56	193,410 75	20,293 06	16,967 36	1,955 61	50,854 99	3,900 62		1,541,715 95
1902-1903	1,716,597 20	392,206 93	28,789 97	17,612 79	5,220 88	81,404 18	2,230 26		2,244,062 21
1903-1904	1,478,106 33	233,769 62	26,122 30	30,494 34	5,911 92	109,233 73	3,402 94		1,887,041 18
1904-1905	1,314,485 40	332,914 48	16,471 34	10,346 90	10,018 49	123,082 86	4,258 14		1,811,577 61
1905-1906	1,701,580 71	608,960 79	12,577 29	10,893 17	3,304 77	180,310 73	8,496 09		2,526,123 55
1906-1907 (9 months)	1,478,749 51	724,353 73	10,850 06	6,663 90	21 00	46,124 20	11,785 81		2,278,548 21
1907-1908	1,998,219 92	708,045 83	12,899 84	8,674 95	1,650 00	2,256 65	20,069 03		2,751,816 22
1908-1909	2,254,283 98	687,422 74	53,590 86	205,749 96	281 00	1,352 13	26,224 29		3,228,904 96
1909-1910	3,007,390 82	1,292,259 95	175,152 72	189,902 48	211 00	1,471 49	42,625 96		4,709,014 42
	17,736,944 50	5,221,394 65	372,459 07	511,910 32	30,552 63	630,070 73	124,580 71		24,627,912 61
1910-1911	3,302,279 57	1,614,733 93	153,351 14	6,009 34	4,052 22	1,378 19	11,336 06		5,093,140 45
1911-1912	3,973,259 74	1,594,533 96	119,634 13	11,566 46	10,510 48	1,066 05	32,824 65	971,339 00	6,714,734 47
1912-1913	3,647,457 61	1,621,508 11	171,342 87	60,607 80	7,151 35	1,241 25	22,873 55	3,549,242 00	9,081,423 54
1913-1914	3,313,259 65	1,251,822 37	176,736 89	5,805 98	7,888 50	966 50	27,884 47	2,644,593 00	7,392,957 36
1914-1915	3,177,386 73	943,717 00	68,263 56	4,416 64	5,828 00	969 85	11,738 10	588,124 00	4,800,443 88
1915-1916	2,443,479 92	934,965 37	2,525,528 50	5,997 98	3,075 21	908 15	28,002 62	19,389 00	5,961,346 75
1916-1917	4,189,905 55	1,699,370 06	3,652,729 95	5,553 26	2,184 72	796 85	15,618 26	140,487 00	9,706,644 75
1917-1918	4,557,438 61	2,836,216 40	2,613,708 67	7,929 75	3,686 00	562 25	9,074 15	336,757 00	10,365,372 83
1918-1919	3,615,958 52	5,087,875 81	1,378,275 76	4,819 27	35 00	789 22	12,381 71		10,100,135 29
1919-1920	4,738,840 85	3,900,091 75	1,155,354 64	9,840 33	70 00	430 78	22,837 87		9,827,466 22
	36,959,266 75	21,448,834 76	12,014,925 21	122,546 81	44,480 48	9,109 09	194,571 44	8,249,931 00	79,043,665 54
Increase	19,222,322 25	15,227,440 11	11,642,466 14		13,927 85		69,990 73	8,249,931 00	54,415,752 93
Decrease				389,363 51		620,961 64			

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STATEMENT of Revenue collected within the Canadian National Parks for the Fiscal Year ended March 31, 1920, as compared with the previous Year

Particulars.	Fiscal Year.		Increase.	Decrease.	Net Increase.
	1919-20.	1918-19.			
<i>Rocky Mountain park.</i>	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Rent.....	9,617 18	9,994 16		376 98	
Timber dues.....	586 62	979 37		392 75	
Water rates (sulphur).....	862 16	898 59		36 43	
Cold water rates.....	6,462 48	7,347 71		885 23	
Sewer rates.....	2,554 86	2,990 36		435 50	
Transfer fees.....	120 00	120 00			
Cave and basin bathing tickets.....	9,037 95	7,711 00	1,326 95		
Livery licenses.....	290 00	221 00	69 00		
Pool, billiard and bowling licenses.....	190 00	190 00			
Boat licenses.....	161 00	94 00	67 00		
Butcher licenses.....	90 00	80 00	10 00		
Grazing rental.....	379 00	350 00	29 00		
Hot springs bathing tickets.....	5,982 65	6,096 70		114 05	
Telephone rent.....	2,956 84	2,640 82	316 02		
Fines.....	482 00	303 75	178 25		
Peddlers' licenses.....	64 00	68 00		4 00	
Guides' licenses.....	60 00	15 00	45 00		
Camping permits.....	99 00	78 00	21 00		
Cemetery lots.....	102 00	143 00		41 00	
Tea-room licenses.....	200 00	220 00		20 00	
Sand.....	28 00	15 75	12 25		
Dog licenses.....	346 00	256 00	90 00		
Automobile licenses.....	3,935 50	3,203 00	732 50		
Scales.....	30 75	3 00	27 75		
Ice.....	11 25	11 00	0 25		
Sale of lime.....	15 25	15 25			
Theatre licenses.....	40 00	22 00	18 00		
Building permits.....	65 00	17 00	48 00		
Garden and dairy licenses.....	5 00	45 00		40 00	
Gum machines.....	64 00	28 00	36 00		
Golf coupons.....	3,025 00	2,064 00	961 00		
Sale of lots.....		107 90		107 90	
Coal leases.....		366 85		366 85	
Miscellaneous.....	335 74	282 28	53 46		
Hay dues.....	1 35		1 35		
Draying licenses.....	20 00		20 00		
Chauffeurs' licenses.....	110 00		110 00		
	48,330 58	46,978 49	4,172 78	2,820 69	1,352 09
<i>Glacier park.</i>					
Rent.....	14 75	27 72		12 97	
Camping permits.....	2 00	3 00		1 00	
Grazing rental.....		10 00		10 00	
Timber dues.....	1 75	2 50		0 75	Decrease
	18 50	43 22		24 72	24 72
<i>Revelstoke park.</i>					
Rent.....		20 00		20 00	Decrease 20 0
<i>Yoho park.</i>					
Timber dues.....	152 75	72 12	80 63		
Rent.....	581 70	954 66		372 96	
Transfer fees.....	20 00	6 00	14 00		
Camping permits.....	34 00	2 00	32 00		
Cemetery lots.....	3 00	3 00			
Grazing rental.....	34 00	36 60		2 60	
Fines.....	3 00		3 00		Decrease
	828 45	1,074 38	129 63	375 56	245 93

STATEMENT of Revenue collected within the Canadian National Parks for the Fiscal Year ended March 31, 1920, as compared with the previous Year.—Continued.

Particulars.	Fiscal Year		Increase.	Decrease.	Net Increase.
	1919-20.	1918-19.			
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Jasper park.</i>					
Rent.....	1,866 16	606 68	1,259 48		
Timber dues.....	18,057 25	84 09	17,973 16		
Building permits.....	2 00	3 00		1 00	
Boat licenses and ferry fees.....	20 00	5 00	15 00		
Hay dues.....	6 50	2 50	4 00		
Peddlers' licenses.....	24 00	16 00	8 00		
Fines.....	245 00	181 00	64 00		
Grazing rental.....	242 00	124 00	118 00		
Guides' licenses.....	30 00	12 50	17 50		
Drivers' and livery licenses.....	153 00	49 00	104 00		
Camping permits.....	16 00	14 00	2 00		
Pool, billiard and bowling licenses.....	170 00	90 00	80 00		
Dog licenses.....	197 00	160 00	37 00		
Restaurant licenses.....	20 00	40 00		20 00	
Butcher licenses.....	10 00	10 00			
Telephone rent.....	45 00	20 00	25 00		
Cold water rates.....	31 00	30 00	1 00		
Coal leases.....		2,788 38		2,788 38	
Miscellaneous.....	68 52	37 76	30 76		
Théâtre licenses.....	12 00	12 00			
Transfer fees.....	8 00		8 00		
Sand.....	1 50		1 50		
Cemetery lots.....	3 00		3 00		
	21,227 93	4,285 91	19,751 40	2,809 38	16,942 02
<i>Waterton Lakes park.</i>					
Rent.....	421 42	215 00	206 42		
Camping permits.....	157 00	128 00	29 00		
Timber dues.....	13 75	31 75		18 00	
Fines.....	94 00	30 00	64 00		
Guides' licenses.....	7 50	2 50	5 00		
Grazing rental.....	2,916 00	1,462 20	1,453 80		
Hay dues.....	9 50	9 00	0 50		
Drivers' and livery licenses.....		8 00		8 00	
Boat licenses.....	61 50	49 50	12 00		
Transfer fees.....	2 00	2 00			
Building permits.....	4 00	35 00		31 00	
Tea-room licenses.....	20 00	20 00			
Miscellaneous.....	54 75		54 75		
Pool and billiard licenses.....	74 00		74 00		
Theatre licenses.....	10 00		10 00		
Dog licenses.....	3 00		3 00		
	3,848 42	1,992 95	1,912 47	57 00	1,855 47
<i>Elk Island park.</i>					
Timber dues.....		0 25		0 25	
Camping permits.....	3 00	10 00		7 00	
Boat licenses.....	2 00		2 00		
Tea-room licenses.....	10 00		10 00		
Building permit.....	1 00		1 00		
	16 00	10 25	13 00	7 25	5 75
<i>Buffalo park.</i>					
Timber dues.....	10 25	7 25	3 00		
Hay dues.....	46 30	126 70		80 40	
Grazing rental.....	1,893 00	12 00	1,881 00		
	1,949 55	145 95	1,884 00	80 40	1,803 60

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STATEMENT of Revenue collected within the Canadian National Parks for the Fiscal Year ended March 31, 1920, as compared with the previous Year.—*Concluded.*

Particulars.	Fiscal Year.		Increase.	Decrease.	Net Increase.
	1919-20.	1918-19.			
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Moose Mt. Buffalo park.</i>					
Grazing rental.....	10 00	102 40	.....	92 40	
Rent.....	25 60	.....	25 60	.....	Decrease
	35 60	102 40	25 60	92 40	66 80
<i>Antelope park.</i>					
Grazing rental.....	409 60	195 20	214 40	.....	214 40
<i>Fort Anne park.</i>					
Hay dues.....	47 00	30 00	17 00	.....
Miscellaneous.....	.....	86 37	.....	86 37	Decrease
	47 00	116 37	17 00	86 37	69 37
<i>Point Pelee park.</i>					
Rent.....	30 44	31 60	.....	1 16	Decrease 1 16
<i>Bird Sanctuaries—Lac la Biche.</i>					
Rent.....	10 00	10 00	Decrease 10 00
Totals.	76,742 07	55,006 72	28,120 28	6,384 93	21,735 35

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DETAILED STATEMENT of Surveyed Areas in Manitoba, Saskatchewan and Alberta,
January 1, 1920.

	Manitoba.	Saskat- chewan.	Alberta.	Total.
	Acres.	Acres.	Acres.	Acres.
Area under homestead (including military home- steads).....	8,382,000	27,373,200	18,158,100	53,913,300
Area under pre-emption and purchased homesteads (Sept. 1, 1908, to March 20, 1918).....		5,779,800	2,793,900	8,573,700
Area under half-breed scrip, sales, special grants, etc.	5,089,700	2,310,800	1,232,100	8,632,600
Area granted to railway companies.....	3,566,997	15,177,063	13,120,014	31,864,074
Area granted to Hudson's Bay Company.....	1,196,700	3,183,200	2,175,600	6,555,500
Area of School Land Endowment ($\frac{1}{18}$ of area sur- veyed in sections).....	1,626,000	3,938,000	3,732,600	6,296,600
Area sold under irrigation system.....		76,672	980,850	1,057,522
¹ Area under timber licenses.....	968,500	1,057,600	1,298,400	3,324,500
¹ Area under grazing leases.....	126,700	2,869,100	3,096,000	6,091,800
¹ Area of forest reserves and parks.....	2,386,700	5,953,700	16,754,000	25,094,400
¹ Area reserved for forestry purposes (inside surveyed tract).....	746,300	1,430,000	1,267,500	3,853,800
¹ Area of road allowances.....	973,500	1,466,400	1,279,900	3,719,800
Area of parish and river lots.....	505,200	82,700	118,600	706,500
Area of Indian reserves.....	433,860	1,078,434	1,367,974	2,880,268
Area of Indian reserves surrendered.....	87,560	402,812	302,228	792,600
¹ Area of water-covered lands (inside surveyed tract).	4,246,500	1,909,800	2,291,700	8,448,000
Area now available for entry (includes lands reserved for soldier settlement).....	5,143,300	4,865,000	14,944,000	24,952,300
Total surveyed area.....	35,479,517	78,954,281	85,323,466	199,757,264

¹ Area not available for cultivation.

THE LAND SITUATION, Manitoba, Saskatchewan, and Alberta corrected to January 1, 1920.

Province.	Surveyed Area in Acres.			Unsurveyed Area in Acres.			Total Area in Acres.		
	Land.	Water.	Total.	Land.	Water.	Total.	Land.	Water.	Total.
Manitoba.....	31,233,017	4,246,500	35,479,517	112,337,681	13,355,100	125,692,781	143,570,698	17,601,600	161,172,298
Saskatchewan.....	77,044,481	1,909,800	78,954,281	75,295,839	6,837,880	82,133,719	152,340,320	8,747,680	161,088,000
Alberta.....	83,031,766	2,291,700	85,323,466	75,846,894	2,212,040	78,058,934	158,878,660	4,503,740	163,382,400
Totals.....	191,309,264	8,448,000	199,757,264	263,480,414	22,405,020	285,885,434	454,789,678	30,853,020	485,642,698

A large proportion of the unsurveyed area has not yet been explored, except in a very partial way, and the area suitable for agriculture cannot be estimated with any degree of accuracy..

STATEMENT of Land Sales by Railway Companies having

Year.	Hudson's Bay Company.		Canadian Pacific Railway Company.		Manitoba South-western Colonization Railway Company.		Qu'Appelle Long Lake and Saskatchewan Railroad and Steamboat Company	
	Acres.	Amount.	Acres.	Amount.	Acres.	Amount.	Acres.	Amount.
		\$		\$		\$		\$
1893.....			93,184	295,288	14,164	57,559	1,603	
1894.....	7,526	48,225	43,155	131,628	6,312	28,003	640	
1895.....	4,431	23,209	55,453	176,950	5,623	22,330	2,391	
1896.....	9,299	52,410	66,624	220,360	21,254	88,568	286	
1897.....	10,784	53,277	135,681	431,095	63,800	634,644	2,524	
1898.....	62,000	310,000	242,135	757,792	106,473	363,982	22,534	
1899.....	56,875	274,625	261,832	814,857	58,019	199,558	61,030	178,517
1900.....	70,196	352,631	379,091	1,152,836	133,507	437,449	18,932	53,974
1901.....	82,308	399,804	339,985	1,046,665	59,749	214,953	22,266	74,810
1902.....	269,577	1,412,332	1,362,478	4,440,500	206,411	713,365	39,835	147,365
1903.....	330,046	1,939,804	2,260,722	8,472,250	250,372	699,210	843,900	1,476,900
1904.....	144,857	879,910	857,474	3,516,864	29,522	113,303		
1905.....	139,721	865,905	411,451	2,045,800	80,342	296,936		
1906.....	236,191	1,863,375	1,012,322	6,015,060	83,418	360,889		
1907 (9 months to March 31).....	69,158	742,221	851,083	4,817,682	3,051	22,645	1,353	16,789
1908.....	21,184	267,215	81,060	727,367	31,982	153,007	5,621	68,869
1909.....	25,449	288,836	29,331	383,390	10,396	84,845	37,662	380,371
1910.....	104,382	1,297,454	655,585	10,473,425	14,501	126,950	106,000	964,600
1911.....	267,038	3,747,768	715,095	10,372,661	20,313	284,859	113,533	1,237,204
1912.....	42,554	808,943	855,280	12,420,488	18,932	117,497	35,213	495,116
1913.....	53,581	1,128,806	447,158	6,348,352	2,768	48,639	15,395	255,399
1914.....	26,292	572,837	263,962	4,242,089	7,626	91,948	1,629	21,546
1915.....	16,400	306,550	151,262	2,496,872	489	5,508	1,292	19,118
1916.....	79,310	1,273,144	242,215	3,670,421	4,780	58,808	12,246	180,361
1917.....	254,941	4,234,244	405,764	6,612,040	12,470	165,245	21,533	331,596
1918.....	386,394	6,914,947	545,285	11,044,883	25,933	321,005	49,723	783,062
1919.....	285,561	4,978,950	602,555	10,580,669	5,289	67,214	33,838	527,670
1920.....	276,629	4,724,941	571,571	11,356,146	4,623	56,760	32,095	474,895
Total.....	3,332,684	39,762,363	13,938,793	125,064,380	1,282,119	5,435,579	1,483,074	7,688,162

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Government Land Grants, and by the Hudson's Bay Company.

Calgary and Edmon- ton Railway Com- pany.		Canadian Northern Railway Company.		Great Northwest Cen- tral Railway Company		Total.		Average per acre.
Acres.	Amount.	Acres.	Amount.	Acres.	Amount.	Acres.	Amount.	
	\$		\$		\$		\$	\$ c.
11,260						120,211	352,847	2 93
11,035						68,668	207,856	3 02
46,815						114,713	222,489	1 94
10,553						108,016	361,338	3 34
9,436						222,225	719,016	3 23
15,481						448,623	1,431,774	3 18
24,738	53,335					462,434	1,520,792	3 28
46,653	128,256					648,379	2,125,146	3 27
116,719	352,037					621,027	2,088,269	3 36
323,494	1,033,396					2,201,795	7,746,358	3 56
231,800	909,600	183,736	631,503	128,435	522,490	4,229,011	14,651,757	3 46
129,007	563,507	64,469	313,575	41,858	177,081	1,267,187	5,561,240	4 39
109,191	512,898	231,707	1,221,463	17,593	103,564	990,005	5,046,572	5 09
85,784	480,063	204,966	1,014,351	20,003	137,503	1,642,684	9,871,241	6 01
59,515	346,064	289,576	1,711,109	4,023	41,470	1,277,759	7,697,330	6 02
8,606	75,644	196,946	1,746,504	1,294	13,855	346,693	3,052,461	8 80
6,370	66,508				165	109,373	2,211,885	11 03
18,323	182,926	285,428	2,783,010	571	6,863	1,184,790	15,835,228	13 36
11,820	116,231	277,414	3,336,797	1,438	27,417	1,406,651	19,122,937	13 59
10,853	154,424	365,926	4,216,578	632	11,373	1,329,390	18,224,419	13 70
4,155	44,212	182,491	2,009,642	1,601	32,105	707,149	9,867,155	13 95
19,575	460,129	182,491	2,009,642			501,575	7,338,191	14 75
23,042	444,018			316	6,956	192,801	3,279,031	17 01
11,689	172,033			4,646	81,182	354,886	5,435,949	15 32
33,821	573,875	17,796	298,938	8,829	141,439	755,154	12,357,377	16 35
53,335	815,628	39,546	732,351	16,021	275,721	1,116,237	20,887,600	18 71
31,774	479,496	65,110	1,261,963	14,530	252,774	1,038,657	18,148,736	17 47
26,953	425,656	86,305	1,685,241	27,981	464,586	1,026 157	19,188,225	18 69
1,491,797	8,389,936	2,673,907	24,972,673	289,936	2,304,326	24,492,310	213,617,419	8 72

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THE DOMINION PARKS.

As predicted last year the season of 1919-20 saw an immense revival of tourist travel to the national parks. In fact for part of the season the volume of traffic was almost greater than could be accommodated. Banff, lake Louise, Emerald lake, Glacier, and Jasper were crowded to capacity during July and August, and visitors who had not made reservations in advance found it difficult to secure accommodation. The most marked feature was the increased length of time spent by visitors in the parks. Formerly the majority stayed over for a few days only at each point. Now large numbers spend their entire holidays in the parks, remaining weeks at a time and often the whole season. While this necessarily lowers the number of registrations by decreasing the available accommodation it indicates that the parks are becoming national playgrounds in the true sense of the word.

The continued increase in wild life in practically all of the parks is most gratifying and affords the best evidence of the value of sanctuary protection. Reports from the various superintendents show that in the three parks on the eastern slope of the Rockies both big game and game birds are coming back in large numbers. The superintendent of Jasper park reports that this year the bighorn, which a few years ago in that park had been reduced to very small numbers, now total 5,000. In the Southesk hunting country contiguous to Jasper park last season there were reported to be 2,000 bighorn, evidently an overflow from Jasper park. Similar reports of better hunting come from practically all districts outside park boundaries indicating that the protection afforded by the parks is not only increasing the wild life within their boundaries, but it is resulting, as predicted, in a natural overflow of game which is restocking the hunting areas.

A notable addition to the wild life of Jasper and Rocky Mountain parks was the introduction of a herd of 300 elk secured from Yellowstone National park in Montana. These animals were brought in during the winter and in spite of very severe weather in transit suffered only small loss and are reported to be in excellent condition.

The buffalo herds in Elk Island and Buffalo parks continue to thrive and now number almost 5,000. In view of the large increase the question of the commercial disposal of surplus males is under consideration. From investigations which have been carried on it would appear that a very satisfactory revenue can probably be obtained in the near future. Last March a number of mounted buffalo heads were put up at auction at the Canadian fur sales at Montreal, where they brought prices ranging from \$325 to \$1,025. Robes sold for as high as \$125. The utilization of the wool and hides for manufactures is also being investigated and it has been found that the former can be utilized commercially for the manufacture of carpets, belting, mitts, heavy clothing, etc., while the latter, when properly tanned, can be converted into strong flexible sole leather.

At Point Pelee which was created a national park only two years ago, the results of protection are already apparent. The superintendent reports a noticeable increase of bird life during migration, especially of duck and geese. A gratifying feature is the number of quail now to be found in the park. The increase in muskrats is also very satisfactory. During the past winter it was estimated that there were 2,000 dwellings with an average of six inhabitants each, or a total of 12,000 muskrats in the park. At the prevailing high price of skins, the value of this form of wild life represents over \$50,000.

The work in connection with the protection of migratory birds has been vigorously prosecuted during the year. A number of the provinces have amended their wild life legislation so as to make it conform with the terms of the treaty. In the Maritime Provinces, where this has not yet been done, a temporary staff of migratory bird wardens was organized. A staff of honorary game wardens, which at present numbers nearly 200, is also being formed throughout the Dominion to serve primarily

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as an observation service. In addition the Royal Canadian Mounted Police throughout the Dominion have been made special wardens under the Migratory Birds Treaty Act. The existence of a colony of from fifty to one hundred trumpeter swans in Western Canada was discovered and reported to the department by a western ornithologist. Up to the time of the discovery of this flock only a few isolated specimens of this species were believed to exist on the continent. A special warden has been placed in charge of the colony and it is hoped that under protection this valuable species may be perpetuated. An educational campaign involving the publication of a number of pamphlets both in English and French, special articles, lectures and moving pictures was also carried on.

In connection with the protection of wild life in the far north a Royal Commission was appointed to investigate the question of the domestication of caribou and muskox, and the introduction of reindeer for commercial purposes. A number of sittings have taken place and an important volume of evidence has been collected which will shortly be issued in the form of a report.

An advisory board composed of several of the most prominent Canadian historians was appointed to assist the department in the work of the preservation of our historic sites and monuments. A survey of the important sites and remains throughout Canada is now being made and data collected which will form the basis of a future policy in connection with their preservation and memorialization.

NATURAL RESOURCES.

Owing to the increase of inquiry regarding the specific resources of all the provinces and the outlet for these resources abroad, it has been found advisable to publish a map localizing minerals, cereals, fish, fruits, timber or water-powers and indicating foreign trade routes. Sets of coloured slides with descriptive notes also have been placed in Australia, France, and Great Britain, and accounts of the latest developments in all the provinces continue to be spread by means of technical articles and "illustrated pamphlets." Every legitimate effort is thus made to increase the supply of three of Canada's pressing needs, population, capital, and foreign trade.

EASTERN CANADA.

Outside interest in Quebec, Ontario, and the Maritime Provinces continues to grow. During the past year attention has been especially focussed on the following items of interest: pulpwood areas, iron deposits, the further domestic refining and manufacture of the raw material of asbestos, nickel, pyrite, platinum, mica, graphite, chromite and of the other products of the rich and varied deposits in southern Quebec, and in eastern and northern Ontario, the rock salt and potash deposits of Malagash, N.S., and the oil shales of Gaspé.

NORTHERN ALBERTA AND THE MACKENZIE BASIN.

Increased facility for transportation is a natural result of the continued influx of settlers to the Peace river and other regions of northern Alberta, combined with the discoveries of coal, gypsum and other resources described in the 1919 report. The ballasting of the last few miles north of Leismer of the railway to McMurray will facilitate connection with the Hudson's Bay Company's ss. *Mackenzie River*, which in 1920 is scheduled for three trips from Fort Smith to Fort McPherson, and assist the many drilling outfits attracted to the Mackenzie basin. It is gratifying to note the encouragement given to such explorers by the drilling at Fort Norman, which struck an eight barrel flow at 80 feet. The bituminous sands of North Alberta, which may be surface indications of an oil basin, are themselves a subject of much consideration.

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The present cost of transportation making competition with other sources of asphalt impracticable, it is suggested that a reduction plant might be erected in their neighbourhood as the basis of a new chemical industry, whereby varied by-products could be put on the market without the hauling cost of deadweight.

SASKATCHEWAN.

Among natural resources to which attention has of late been called there may be mentioned the occurrence of oil and gas at Alameda and in the south, of oil near Dewar lake on the western border and of bituminous coal at the eastern edge of the lignites in the Lampman district. The success of the experiments in briquetting lignite at Bienfait is resulting in the erection of a plant of considerable capacity. That Saskatchewan, which has been proved to have very large and valuable clay deposits, should import brick and tile products from abroad is an anomaly which cannot last long. The large deposits of sodium and magnesium sulphate at Fusilier, Dana, Ceylon, and other localities in the south have been subjects of inquiry, and the prospect of an industry derived from the evaporation of salt from the brine springs of Senlae is to be noted.

MANITOBA.

The products of the northern Manitoba copper mines continue to be shipped to the smelter at Trail, B.C., where this ore is found to be specially suitable for fluxing with those of Rossland. It is not mere conjecture that the mineral areas of northern Manitoba and Saskatchewan lie on a belt surrounding the Canadian shield and that outcrops in any part of that belt may indicate considerable mineral deposits. Smelting facilities in these northern parts depend on the completion of railroad lines and the attraction of capital looking for use.

UNOCCUPIED AND UNCULTIVATED LANDS.

Among the natural resources of Canada agricultural land is by far the most important, and its development is essential to the prosperity of the country. The day of the free homestead within easy reach of a railway is rapidly becoming a thing of the past and means other than free grants must be looked to as an inducement to rural development.

There are tens of millions of acres of good accessible lands in private ownership which are now unoccupied and uncultivated owing to the non-residence of the owners. The information already published by the department as to the location of such lands in the Prairie and the Maritime Provinces was so useful in meeting the requirements of those wishing to purchase land in the more settled districts that further lists have been prepared giving certain useful particulars, such as area, character of soil, distance from markets, price, terms, etc. This information is now being printed in booklet form for general distribution, and thereby an important step is being taken to put the man who wishes to go on to the land in direct touch with the owner of idle lands, and thus enable him to get placed in the more settled localities, with their better transportation, market and social facilities, where his efforts will be of more economic value to the country and of greater profit to himself.

DOMINION ASTROPHYSICAL OBSERVATORY, VICTORIA, B.C.

This is the second annual report upon the work of this observatory, in which actual observational work was begun on May 6, 1918. As the details of the work are presented in complete form in the publications of the Dominion Astrophysical Observatory, of which eight numbers are already issued, it will only be necessary here to present a brief summary of what has been accomplished.

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The work of the observatory during the past year has mainly consisted in the continuation of the programme of observation and measurement of the spectra of some 800 stars of magnitudes between 5.5 and 8.0 selected from Boss's Preliminary General Catalogue. This work was commenced as soon as the telescope was completed and will be continued energetically until the radial velocities of these stars have been determined, which it is estimated will take about another year. This programme was compiled, after consultation with several eminent astronomers as to the most necessary and useful work for the new telescope, in co-operation with the Lick and Mount Wilson Observatories, the only institutions besides our own with instrumental equipment sufficiently powerful to attack these relatively faint stars. It was so arranged and divided that the velocities of all the stars, which are within reach at Victoria and Mount Wilson, in Boss's catalogue in which the radial motions are especially important to be obtained on account of their proper or cross motions being known, would be completed at about the same time.

Good progress has been made on this important work, which is now about two-thirds completed. In the year April 1, 1919, to March 31, 1920, 2,275 star spectra, between the numbers 1727 and 4001, have been obtained on 199 nights. On some 20 additional nights the dome has been opened and an exposure on a stellar spectrum started, but owing to clouds or other bad conditions this could not be finished and no complete observation was secured. On 29 of the 199 nights only one or two plates were obtained and only on about 150 nights was the sky continuously clear throughout. One clear night could not be used while the mirror was being resilvered and one was taken up by the refiguring and testing of the Cassegrain mirror. Otherwise it may be safely said that the telescope was engaged in actual observations on every usable night, including Sundays and holidays, in the year.

Since the staff has been increased, although it takes about three times as long on the average to measure and reduce a plate as is required in obtaining it, the measurement of the spectra have been kept well up to date and the final velocities of nearly half the stars on the programme have been determined. None, however, will be published until the whole programme is completed. In the course of this measurement 56 spectroscopic binaries have been discovered, as compared with 54 in the first year, and our first list of 100 new spectroscopic binaries is now being published.

In addition to and in a sense complementary to the main programme, a number of independent investigations have been carried through by the members of the staff. These include the determination of the spectroscopic orbits and consequently also of the absolute linear dimensions and separations, and of the densities and masses of the eclipsing variables U Ophiuchi, R.S. Vulpeculæ and T. W. Draconis by the director; of the determination of the orbits of the spectroscopic binaries, Boss 4507, Boss 5026 and Delphini by Mr. W. E. Harper; of the determination of the orbit of Boss 4669 by Dr. R. K. Young. There are besides numerous uncompleted investigations in process by each of these astronomers and also by Mr. H. H. Plaskett, recently appointed, which will be reported next year.

The testing of the optical properties of the telescope was continued by the director with the result that although the figure of the principal mirror was practically perfect it was felt that the results with the secondary or Cassegrain might be somewhat improved by a slight refiguring and it was deemed advisable to take advantage of the clause in the contract requiring the optician, if necessary, to refigure the secondary mirror after installation, without additional cost outside his travelling expenses to Victoria. This was done in August, 1919, resulting in considerable improvement in the image given by the Cassegrain combination as determined by later tests by the Hartmann method. Continued operation of the equipment has only served to confirm and strengthen the favourable opinion of its completeness and accuracy, and of the convenience and ease of operation previously formed and there is no doubt that it forms a decided advance over existing instruments in all these particulars.

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The privilege extended to the public of viewing celestial objects through the telescope on Saturday evenings between eight and ten o'clock has been fully taken advantage of with an average attendance during the tourist season of about 200 which is reduced during the winter months to about 50. In addition every week day visitors are admitted and have the operation of the telescope explained to them and this is also fully taken advantage of and appreciated, the daily attendance in the summer months being between 50 and 100. Visitors are registered here from all over the world and the situation of Victoria, direct in the path of Oriental travel, and the pride which the local authorities take in the institution cannot fail to make it and the enterprise of the Government in establishing it increasingly known and appreciated.

The scientific staff of the observatory which consisted at the beginning of the year of the director and Dr. R. K. Young was increased by the transference of Mr. W. E. Harper from the Dominion Observatory, Ottawa, about the middle of April and by the appointment of Mr. H. H. Plaskett and his reporting for duty early in October. These additions have enabled the telescope to be more efficiently used and the work to be more nearly kept up to date. The original estimate of a director and four astronomers being required will not likely be exceeded and an additional astronomer should be appointed as soon as possible.

It is a matter of great regret and of loss to the work that the additional buildings so urgently needed have not yet been provided. The temporary office quarters on the ground floor of the observatory building are now very crowded and entirely inadequate to properly and efficiently carry on the work and a suitable office building, which need not be expensive, is essential if full advantage of the possibilities of the telescope is to be utilized. Equally necessary are residences for the astronomers engaged in night observations as the present arrangement whereby they have to travel seven miles by train and climb a mile and a half to the observatory for night work is not only unfair to them but obviously prevents, on many occasions when the weather is uncertain, full use of the telescope. In view of the large capital cost of the undertaking and the value of the work, this should not be permitted and both residences and office building should be erected as soon as possible.

Besides numerous papers in different astronomical publications by members of the staff the following numbers of the publications of the Dominion Astrophysical Observatory have been issued during the year.

Vol. 1, No. 1.—Description of Building and Equipment, by J. S. Plaskett.

No. 2.—The Spectroscopic Binary 12 Lacertæ, by Reynold K. Young.

No. 3.—The Spectroscopic Binary H. R. 8170, by J. S. Plaskett.

No. 4.—The Orbit of the Spectroscopic Binary Geminorum, by Reynold K. Young.

No. 5.—The Orbit of the Spectroscopic Binary Boss 4507, by W. E. Harper.

No. 6.—The Orbit of the Spectroscopic Binary Boss 4669, by Reynold K. Young.

No. 7.—The Spectroscopic Orbits of the Eclipsing Variables U Ophiuchi, R.S. Vulpeculæ, T. W. Draconis, by J. S. Plaskett.

No. 8.—The Orbit of the Spectroscopic Binary Delphini, by W. E. Harper.

DOMINION OBSERVATORY, OTTAWA.

During the fiscal year 1919-20 work with the meridian circle was prosecuted on the same programme as in recent years; observations were obtained on 99 nights, the weather on the whole being rather unfavourable. The present observing programme, which has been somewhat delayed on account of the prevalence of poor observing conditions in our climate during the winter months, is now approaching completion;

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the computations necessary for the reduction of the observations, however, which were almost at a standstill throughout the war, are still in arrears. Some preliminary work was done on the measurement of the division errors of the two large graduated circles, which require to be determined before the reductions can be definitely completed. It is hoped to complete the greater part of these measurements during the present summer.

Field observations for latitude and longitude were carried out at one station in eastern Quebec. The longitude was determined directly from Ottawa by electric telegraph; the latitudes, as usual, by Talcott's method.

The time service has been maintained as in previous years. There are nine secondary master-clocks synchronized continuously from the observatory, these in turn control 386 clocks and dials of various kinds, including the tower-clocks at the observatory and the city post office. In the near future the system is to be extended to the Hunter building and the new Parliament Building. Relays beating seconds are maintained in three offices in the city, one clock is synchronized every hour, time signals are sent out by telegraph and telephone, and the time is recorded on the various seismographs at the observatory. A comparison is made daily with Washington time by means of the wireless time-signals sent out by Arlington; this enables us when desirable (as, per example, during long periods of cloudy weather) to make use of the Washington observations as well as our own, for determination of clock-error. During each of the past two winters tests have been made of the rates of a number of box chronometers under varying temperature conditions. As a result it has been found possible to very materially improve the performance of several of these chronometers by a readjustment of the temperature compensation.

The large equatorial telescope was utilized as heretofore for obtaining radial velocities of stars. A total of 305 spectrum plates were exposed and about 314 stellar and planetary spectra obtained including about 66 stars, mostly class B, on about 66 nights; of these about 179 spectra have been measured and reduced to date. Three new short period spectroscopic binaries were found.

Successful tests were carried out on a new differential expansion thermostat for controlling the temperature of the prism box.

Vernier scales and their illuminating systems were improved in connection with observations on the two Metcalf comets of August and September, 1919.

The equatorial was available to the public on Saturday nights, and many visitors enjoyed the privilege.

With the coelostat and solar spectrograph 219 plates comprising 1,050 exposures (each of which includes 9 strips of spectra of various combinations of centre, limbs and intermediate points of the solar disc along with iodine and electric arc comparisons) were made. Measurements of rotation, wave-lengths, etc., were continued. Also, 70 photographs of sun-spots were made. Some relationships between variations in the sun and solar system and terrestrial changes were found.

The photographic equatorial telescope has been used entirely for photometric work during the past year. About one hundred plates of various fields have been obtained and most of them reduced by the extra-focal method.

Nova Aquilae No. 3 has been removed from the observing list and the measures of its light up to the end of 1919 are ready for publication. All plates of 12 Lacertae, b Persei and 20 Cassiopeia have been reduced and the results will be published shortly. Five fields in the region of the Pole have been measured for comparison of the magnitude scale with those of other observers and several new stars have been added to the observing list.

The field work, in connection with the magnetic survey of Canada, carried on by the Dominion Observatory, was confined during the past season to stations previously occupied, for the purpose of securing secular variations or annual change

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data. Sixty-four stations in all were occupied representing fifty-five distinct localities. In the spring and fall observations were taken at Ottawa, as well as a series of comparison observations at the magnetic observatory, at Agincourt.

During the fiscal year 96 earthquakes have been registered as compared with 137 in the last fiscal year. Of these only 28 were sufficiently well marked to permit of a distance being deduced. The whole period has been remarkable for the absence of large and the scarcity of well-marked earthquakes. The deformation instrument continued to function in the study of the tides of the solid earth.

The seismographs of the observatory at Saskatoon and at Halifax continue to supply valuable data.

The undagraph at Chebucto, recording every wave of the Atlantic on the coast of Nova Scotia, correlated its record with the micros noted at the observatory.

Monthly bulletins were issued as usual of the Ottawa seismograms, and distributed to earthquake stations all over the world.

The library contains some 10,000 bound technical books, periodicals and pamphlets which are being catalogued, classified and indexed, requiring some 60,000 cards. The congestion and want of adequate space for the books is again drawn attention to, with the hope that the plans prepared in 1914 by the Department of Public Works for enlargement may soon be proceeded with.

There were issued 23 publications of the observatory, which meant a distribution of some 10,000 numbers amongst 400 observatories and scientific institutions of the world.

The machine shop of the observatory has been busy with constructing instruments and apparatus for the observatory, and has also attended to some repair work for the Geodetic Survey and Boundary Commission.

At the annual meeting of the American Astronomical Society at Ann Arbor, Mich., the Dominion Observatory presented several papers, and was represented by the director, who is a member of the council, and by Dr. DeLury.

With the return of members of the staff from overseas the work of the observatory is again assuming normal proportions and is being pursued with more vigour than ever.

RECLAMATION.

DRAINAGE.

The Drainage Division of the Reclamation Service, the formation of which was approved in February, 1919, was thoroughly organized in the following spring, so that by June 1 some of the parties were able to take the field.

An important programme of work was carried on during the remainder of the year, the result of which has been to render available valuable information regarding the feasibility and practicability of a few big and a large number of small projects, concerning which the department was being pressed for information and decision.

The new co-operative legislation passed by the Federal Government and the Provincial Governments of Alberta and Saskatchewan to remove certain administrative obstacles standing in the way of drainage development, has greatly facilitated the work of reclaiming swampy and flooded areas in Alberta and Saskatchewan. The province of Manitoba has not yet passed legislation to enable it to benefit by the new arrangement, but four investigations were made in this province by the Reclamation Service, three at the request of the Soldier Settlement Board and one at the request of settlers.

It is anticipated that the movement for drainage development in the West will be very much stronger during 1920 as the legislative and engineering facilities for this work are now becoming widely known throughout the districts requiring reclamation by drainage.

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INTERNATIONAL WATERWAYS TREATY.

The flow of the St. Mary and Milk rivers was again divided under the provisions of an interim order made by the International Joint Commission. It is hoped that a final adjustment of this question will be made in the near future by the commission.

HYDROMETRIC SURVEYS.

The years 1917 and 1918 were very dry but 1919 was equally as dry, if not drier, than the two years preceding. The records of stream-flow obtained show that the total discharge of streams is, in almost all cases, the lowest on record. The data acquired are very valuable as they indicate for most streams what is probably a minimum flow.

IRRIGATION.

Had there been stored moisture from previous years in the soil, conditions in 1919 might not have been so serious but without this, those who depended upon dry farming methods for good crops, were doomed to disappointment. On the other hand, the comparatively few holding water rights, were able to supply the much needed moisture at the right time, with results in many cases so splendid in comparison with neighbouring dry farmers, that prejudices against irrigation in southern Alberta and Saskatchewan are largely removed from the minds of all in these localities.

The programme of surveys to determine the feasibility of several large projects, which had to be curtailed during the great war, was again taken up. Very good progress was made with this work but unfortunately the field season was cut short by early severe weather. These surveys will be largely completed in 1920.

Some of the survey work was delayed for a short time in the spring pending an understanding being reached between the Federal and Alberta Governments regarding a division of the responsibility in connection with surveys for and construction of the larger projects. It was finally decided that the Dominion Government would be responsible for survey work and a certain amount of supervision of construction, while the provincial or local authorities would undertake construction of these projects. Survey work was immediately resumed when this understanding was reached.

WATER SUPPLY INVESTIGATIONS.

These investigations in connection with domestic and stock water supplies were continued in 1919 although, owing to the pressure of other work, it was not possible to give them as much attention as in previous seasons. However, considerable information was obtained and several reserves were created in the interest of the *Better Water Supply Scheme for Alberta*.

MINING LANDS.

The year has been marked by greatly increased activity in nearly all forms of mining operations. Owing to the increased cost of production the gold industry has been confronted by an operating cost almost as great as the value of the article produced, and since there can be no compensating adjustment of the selling price so long as the integrity of the gold standard is maintained, gold mining has not been as profitable as in the past, and as a result has not been prosecuted with as great vigour.

With the discovery of rich deposits of silver-lead ore in the Mayo district, mining in the Yukon Territory has entered upon a new era, and much is expected from this discovery as soon as more efficient transportation facilities can be secured.

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Mining in northern Manitoba may now be considered an established industry, and in case the results from operations being conducted this season on mining claims in the Flin Flon Lake district are moderately successful, the construction of a railway and the erection of a smelter appear to be assured.

Operations for the discovery of oil in quantity in the western provinces and territories are being prosecuted with great vigour. Machinery of the most modern character is being employed, and wells are being bored over an area extending from the international boundary to the Lower Mackenzie River basin. While natural gas in quantities far beyond the market requirements has been released in different parts of the western provinces, and oil in conservative quantities has been discovered at different points in the province of Alberta, no large flow of oil has yet been found, but it is confidently expected that the intensive operations of the present year will reveal the presence of an extensive oil-field in Western Canada.

WATER-POWERS.

The fundamental importance of the water-power resources of the Dominion is conclusively shown by the results of an exhaustive census and analysis of the developed water-power in Canada, just completed by the Dominion Water Power Branch. The total power installation throughout the Dominion approximates 2,418,000 turbine or water-wheel horse-power, of which 2,215,000 horse-power is actually and regularly employed in useful work. The ultimate capacity of the plants now operating, together with new plants at present under construction, totals 3,385,000 horse-power. The total capital invested in central electric stations alone is \$401,942,402.

With a water-power development of 274 horse-power per capital Canada stands well in the forefront with respect to availability and utilization of her power resources. She is only surpassed in this respect by Norway. The enormous water-power resources still untouched form a substantial basis for the progressive exploitation and development of other natural resources, and, if properly co-ordinated with the development and utilization of the enormous fuel reserves of the Dominion, are an assurance of continued industrial expansion and prosperity.

A fundamental necessity to the best development and use of the fuel-power resources of the country is a definite plan or programme. Satisfactory progress is being made in the evolution of a master fuel-power policy for this purpose. The Dominion Power Board organized on April 25, 1918, and comprising in its personnel engineers of the Dominion and Provincial Government services peculiarly fitted by experience and position to assist in the problem, is charged with the responsibility for working out such a policy.

Through the efforts of the Dominion Water Power Branch very satisfactory progress indeed has been realized in the consolidation and co-ordination of Government efforts in connection with the investigation, the administration and the exploitation of water-power resources. A very important step in this connection is the preliminary arrangements for the establishment of a Dominion Hydrometric Survey. It is expected that this will be accomplished by the consolidation of all the hydrometric survey organizations employed by the Department of the Interior.

Positive progress has been made in the administrative feature of water-power development by the passing by Parliament of the Dominion Water Power Act, (chapter 19, 9-10 George V), which replaces section 35 of the Dominion Lands Act, under which section there have been established by Order in Council from time to time regulations providing for the administration of water-powers under the control of the Department of the Interior in the provinces of Manitoba, Saskatchewan and Alberta, the railway belt of British Columbia, and the Yukon Territory.

The new Act elaborates, extends and defines in general terms, the power and authority of the department respecting the investigation and administration of water-

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powers, and provides for the establishment of appropriate regulations by order of the Governor in Council. Substantial progress has been made in the evolution of the new water-power regulations, and it is confidently expected that when these are promulgated they will prove a panacea for most of the difficulties which have been confronting the department in its endeavour to encourage the proper exploitation of the water-power resources placed under its responsible charge.

One very important feature of the water-power efforts of the department, and of great importance to the Dominion generally, is the extensive research in water-power laws, regulations and problems of other countries. This work has been carried on under the immediate supervision of Mr. H. W. Grunsky, a legal expert of much experience in water-power and water resource administrative problems. It is doubtful whether, owing to the great expense involved, the mass of information collected and collated to date can be made generally available in printed form to the interested public, but special arrangements are being perfected for furnishing typed copies to administrative officers concerned with water-power problems throughout the Dominion and the Provincial Government services, as well as to such officers in other parts of the Empire and among countries allied with Great Britain during the great war. The efforts of Canada in this respect have been highly commended by officials of other countries, and especially by those of the sister dominions of the Empire.

The co-operation of the department with other federal and provincial organizations concerned with water-power and cognate problems has been satisfactorily maintained and substantially extended during the year. Formal co-operative agreements have been entered into with the Maritime Provinces (Nova Scotia, New Brunswick, and Prince Edward Island), and with the Hydro-Electric Power Commission of Ontario, whereby the basic water resource investigation, including hydrometric survey work in these portions of the Dominion are undertaken by the Dominion Water Power Branch.

During the past year the return of officers from overseas service has recruited the staff almost up to pre-war strength, with the result that it has been possible to undertake important water-power investigatory and administrative work that had been temporarily suspended during the war.

FORESTRY

The summer of 1919 was the most disastrous for forest fires since the establishment of the forest reserves. All through the West the spring was early and dry. Spring and early summer, especially in Manitoba and Saskatchewan, were characterized by extreme drought and the weather continued very dry throughout the summer in Alberta and British Columbia. By strenuous exertions the field staff were able to hold the general situation well in hand, but a number of fires got away and heavy damage to the forests resulted. Saskatchewan suffered the heaviest loss of all the provinces, the largest fire occurring in the Battleford fire-ranging district. In Alberta the most serious fires occurred in the Bow River forest. In British Columbia there were a number of fires but the loss was small compared with that in Saskatchewan and Alberta. It may be noted that in the states of Montana and Idaho the losses from forest fires in 1919 were among the most serious ever experienced in that region. The cost of fighting forest fires during June, July, and August in those states was over two and a half million dollars.

There is a considerable increase in the revenue received from Dominion forest reserves, the total for the past year being \$127,975, which is five times what was received for the year 1913-14. Such a marked increase in revenue indicates the increasing importance of the forest reserves to settlers and to nearby communities.

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The growing importance of forestry and forest conservation to the British Empire has led to the call, by the forest authorities of the United Kingdom, of a forestry conference to meet in London in July of this year (1920). It is confidently expected that the result of this gathering will be to accelerate the movement to apply modern scientific methods to the management and development of the forests of the Empire.

The work at the Petawawa (Ontario) forest experiment station of studying the best methods for the regeneration of cut-over and burned-over forests has been continued, and a number of additional sample plots located, marked, and recorded.

Experimental work in setting out and recording the growth of forest tree plantations at Indian Head (Saskatchewan) nursery station has been carried on as usual, the information obtained therefrom being of great value in the planting work of the Forestry Branch on the forest reserves, and to the farmers in setting out wood-lots and shelter-belts. The season being hot and dry was unsatisfactory one for tree-growth, and the percentage of loss in the farmers' plantations which had been set out under the supervision of the Forestry Branch was much higher than usual. The demand by prairie settlers for trees for planting which, owing to labour shortage, fell off somewhat during the war years, is again increasing and promises to increase steadily in the future.

At the request of the Forestry Commission of the British Isles a large quantity of Sitka spruce seed was collected by officers of the Forestry Branch, and shipped to Great Britain for use in planting and seeding operations there. This seed was collected in the Queen Charlotte islands, British Columbia.

Very successful moving pictures showing forest fires, how they start and how combatted, were taken, also pictures showing the different operations in tree-planting on the prairies from beginning to end. Canadian moving-picture theatres, lecturers and educational institutions will thus no longer have to depend on pictures of such scenes taken in other countries.

Improvement work in the forest reserves had to be curtailed on account of the fire situation which necessitated the attention of a large part of the field staff throughout the season, and considerably reduced the funds available for this purpose.

The demand for grazing permits increased greatly over last year, 1,653 being issued. This is an increase of 40 per cent over the previous year, and indicates that the grazing resources of the reserves are being appreciated by the settlers on adjoining lands. This is also shown by the increasing number of grazing or stock associations being formed by the settlers. The demand for grazing has made it necessary to ascertain the maximum carrying capacity of the various grazing districts and reconnaissances have been made on several of the reserves. As a result it has been found that more stock can be accommodated on several of the reserves than was formerly deemed possible.

While somewhat hampered by the post-war conditions referred to in last year's report, the Forest Products Laboratories continued their work of assisting Canadian industry by investigating native woods and wood products.

REPORT OF THE COMMISSIONER, J. W. GREENWAY.

REPORT OF THE CHIEF INSPECTOR OF DOMINION LAND AGENCIES,
H. G. CUTTLE.

During the year I held a great many investigations in connection with Dominion Lands, many of which were under oath, authorized by Order in Council. I also visited all the land offices in the provinces of Manitoba, Saskatchewan, and Alberta, except Peace River district. During the year I found everything in a most satisfactory condition, the work of the offices well kept up and all the officials giving good service to the department.

During the past fiscal year collections in connection with 1914-15 seed grain distribution amounted to a little more than \$1,000,000, which I consider very good taking into account the bad crops prevailing throughout the West during the year 1919.

In reference to the seed grain distribution for the past fiscal year I may say that up to March 31 I approved of 3,661 applications for seed grain advances, which necessitated the furnishing of 146,781 bushels of wheat, 170,575 bushels of oats, and 5,035 bushels of barley. During the year 36 applications were cancelled, the parties making other arrangements.

My assistant is kept on the road very steadily in connection with seed grain and Dominion lands investigations. I also use him a great deal in connection with the relieving of offices, and he has proved a very valuable official.

The travelling auditor is also attached to my office. His duties keep him on the road most of the time checking up the land offices and making reports. I find he has done excellent service during the past year, and I am satisfied head office is now more fully aware of the transactions of the different land offices than formerly with the reports that were made by the ordinary inspectors.

Two homestead inspectors are also attached to my office. Their duties are taking applications for patent in districts not served by sub-land offices, and a great benefit has been derived by the settlers from their work. They have taken several hundred applications during the past year, which has been the means of saving several hundreds of dollars to homesteaders wishing to prove up. They have also held special investigations for me in connection with seed grain and other matters.

Since closing my records for the fiscal year ending March 31, 1920, I was in receipt of a telegram announcing the death of George H. Macdonnell, Agent of Dominion Lands at Lethbridge, which occurred on April 1. Mr. Macdonnell was one of the most efficient officials in the service, and his place will be hard to fill.

GEORGE V, A. 1921

REPORT OF THE INSPECTOR, O. NEFF, OF DOMINION LAND AGENCIES,
MOOSOMIN, SASK.

Agency.	Home- stead entries granted.	Land Sales.			S. A. Scrip.	Appli- cations for Patent re- ceived.	Land Entries Can- celled.	Permits Issued.	
		Ordin- ary and School Lands.	Pre- emp- tions.	Pur- chased Home- steads.				Timber.	Hay.
Battleford.....	351	23		36		862	709	312	2,190
Dauphin.....	723	28				684	359	2,199	1,214
Moosejaw.....	373	32	3	1		3,549	377	29	1,630
Prince Albert.....	921	63				1,281	644	1,172	1,656
Saskatoon.....	204	63				1,736	706	435	1,292
Swift Current.....	212	17				4,766	720	140	687
Winnipeg.....	508	59				1,474	1,011		
The Pas*.....	Mining locations (444) Assessment payments (35).								
Total.....	3,292	285	3	37		14,352	4,526	4,287	8,669
Compared with 1918-19...	2,007	287	4	510	1	13,132	2,102	1,914	5,992
Compared with 1917-18...	4,323	414	569	128	5	13,246	3,326	1,422	6,288

*The Pas Office is that of a mining recorder who is also sub-agent.

DOMINION LAND SUB-AGENCIES—Manitoba and Saskatchewan—Work Performed dur-
ing the Departmental Year ending March 31, 1920.

Name.	Sub-Agency.	Applications for					
		Home- steads.	Graz- ing.	Patent.	Inspec- tion.	Timber permits.	Hay permits.
C. J. Lee.....	Assiniboia.....	40	24	754	63	1	16
J. Cusack.....	Empress.....	6	4	231	17	6	17
Wm. Banks.....	Gull Lake.....	3		26	5		8
A. Reid.....	Kerrobert.....	4	2	43	2		52
G. G. Blackstock.....	Kindersley.....	1	28	94	5		11
W. H. Holland.....	Lloydminster.....	22	37	79	18	11	203
C. H. Stockdale.....	Maple Creek.....	27	91	552	51	66	93
J. McCordie.....	Meadow Lake.....	51	15	13	28	57	259
W. Young.....	Melfort.....	50	18	272	62	9	38
J. Deans.....	North Battleford.....	109	58	149	61	21	285
W. Giroux.....	Ponteix.....	42	15	534	65		17
D. McMurphy.....	Preeceville.....	31	1	289	29	7	56
F. M. Gilmore.....	Shellbrook.....	26	15	61	4	6	8
Dan Hughes.....	Turtleford.....	56	4	184	32	2	48
Wm. Buxton.....	Tisdale.....	167	8	268	146	76	34
M. Langstaff.....	Wadena.....	120	6	261	90	1	23
T. A. Underwood.....	Weyburn.....	23	19	100	39		16
J. A. Duncan.....	Yorkton.....	27		152	12		12
W. B. McLellan.....	The Pas.....	6				21	120
R. J. Campbell.....	Shaunavon.....	25	5	255	20		
Total.....		836	350	4,317	749	284	1,316
Compared with 1918-19.....		677		4,282	477	272	1,124
Compared with 1917-18.....		1,794		5,552	1,548	395	1,377

SESSIONAL PAPER No. 25

STATEMENT showing Principal Work Performed by Homestead Inspectors in Manitoba and Saskatchewan for the Departmental Year ending March 31, 1920.

Name.	Headquarters.	Land inspections made.	Applications for Patent.	Miles travelled.	
				Wagon.	Rail.
D. Anderson.....	Battleford.....	377	18	6,533	210
N. F. Leach.....	".....	326	135	5,322	3,500
G. L. Speers.....	Dauphin.....	424	295	5,810	4,765
T. C. Martin.....	".....	241	183	2,875	6,104
Robt. Hunt.....	".....	196	17	1,503	238
J. F. McKenzie.....	Prince Albert...	131	7	1,125	962
D. L. Burgess.....	".....	188	8	3,707	1,056
W. Morrison.....	".....	329	59	3,880	2,105
J. B. Boucher.....	".....	74	4	1,351	200
Sydney Taylor.....	".....	95		775	1,066
M. A. McLeod.....	".....	94		495	352
C. E. Barr.....	Moosejaw.....	503	93	7,733	2,533
W. Erratt.....	".....	414	21	6,361	1,978
A. Hamilton.....	".....	285	170	5,519	14,714
E. J. Hober.....	".....	571	23	10,267	5,722
A. E. Mosses.....	Saskatoon.....	164	194	4,871	512
A. Henke.....	".....	369	38	6,540	1,570
F. M. Collins.....	".....	129	15	4,128	962
J. A. Balfour.....	".....	174	35	2,726	5,328
A. Smyth.....	".....	388	74	7,733	5,157
J. DeBalinhard.....	".....	473	27	6,106	2,842
L. Lepine.....	Winnipeg.....	485	131	3,036	5,099
W. Lagimodiere.....	".....	316	145	3,667	3,362
H. L. Mabb.....	".....	481	271	4,032	2,840
W. D. Gillespie.....	".....	364	154	4,084	2,743
Geo. McGowan.....	".....	1,025	436	5,663	4,029
W. J. Mayberry.....	Swift Current...	369	225	7,538	2,066
Wm. Shields.....	".....	407	118	9,046	
J. Furnis.....	".....	341	10	5,045	82
P. McLearn.....	".....	178	116	6,683	1,835
J. A. McDonald.....	".....	311	25	5,367	1,169
Total.....		10,222	3,050	149,521	85,101
Compared with 1918-19.....		5,834	2,038	117,491	81,597
Compared with 1917-18.....		6,196	3,022	123,914	95,312

REPORT OF THE INSPECTOR OF DOMINION LANDS AGENCIES, J. W. MARTIN, CALGARY, ALTA.

DOMINION LANDS AGENCIES.—Principal Transactions for the Departmental Year ending March 31, 1920.

Period.	Home stead entries granted.	Land Sales.		Applica- tions for Patent received.	Land entries cancelled.	Permits issued.	
		Ordinary and school lands.	S.S.G.			Timber.	Hay.
Calgary.....	309	41	327	2,299	506	408	1,000
Edmonton.....	1,416	136	1,175	2,670	1,903	1,666	2,594
Grande Prairie.....	824	28	605	559	622	417	279
Kamloops.....	82	20	77	106	48	441	33
Lethbridge.....	120	12	115	1,362	288	390	120
New Westminster.....	45	11	43	41	30		
Peace River.....	779	38	560	383	581	297	502
Revelstoke.....	8	2	10	7	27	160	
	3,583	288	2,912	7,427	4,005	3,779	4,528
1918-19.....	2,221	210		7,094	1,862	3,128	4,300

DEPARTMENT OF THE INTERIOR

GEORGE V, A. 1921

DOMINION LANDS SUB-AGENCIES.—Work performed during the Departmental Year ending March 31, 1920.

Name of Sub-Agent.	Sub-Agency.	Period.	Applications for						
			Home-steads.	Pur. Home-steads.	S.S.G.	Patents.	Inspec-tions.	Tim-ber Per-mits.	Hay Per-mits.
Spicer, S. E.....	Alsask.....		7		20	465	18	10	2
Rennison, G. M...	Athabaska.....		48		34	192	35	33	240
Carlson, A. W....	Durlingville.....		170		19	25	55	59	287
Requier, E. E....	Donnelly.....	1 month.				1	1		19
Cusack, J.....	Empress.....		21		38	440	33	2	22
Jackson, W.....	Entwistle.....		16		12	102	6	15	22
Glover, F.....	Edson.....		12		11	95	16	7	28
Potts, C.....	Fort McMurray.....				2	4	3		3
Barber, J. C.....	Fort St. John.....	11 months.	85		31	9	22		15
Morden, S. A.....	Fort Vermilion...	5 "	14		1	1	2	1	42
McGowan, J.....	Frog Lake.....		28		23	35	16	9	47
Wenman, W.....	Golden.....		1		7	1	1	34	
Reynolds, H. H...	Grouard.....		81		51	50	12	10	198
Trenamen, J. C...	Hanna.....		8		9	322	40	3	48
Holland, W. H....	Lloydminster.....		15			31	7	1	41
Whittaker, J. M...	Mosside.....		27		22	43	6	3	16
Robinson, A. W...	Medicine Hat.....		32		35	494	24		26
McDonald, S. A...	Pine Creek.....		12		7	229	9	13	34
Agar, Norval.....	Provost.....		7		16	504	9	5	70
Jamieson, T.....	Pouce Coupe.....		38		48	118	40	24	15
Hankinson, R. T...	Ry. Mt. House.....		64		23	77	37	32	75
Gee, R. C. P.....	Red Deer.....		34		6	51	28	10	66
Lacey, J.....	Salmon Arm.....		16		10	12	18	2	
Gray, W. B.....	Stettler.....		11		16	176	16	1	14
Fildes, J. M.....	Spirit River.....	11 months.	123		125	83	35	56	60
Racicot, B.....	St. Paul des Metis		56		19	301	46	49	101
LaPlante, J. R....	St. Lina.....		66	1	20	104	45	29	37
Mace, Job.....	Vermilion.....	7½ months	16	1	6	106	37	1	36
McLeod, H. W....	Wainwright.....		8		11	91	5		1
Hughson, W. S....	Whitford.....		12			13	9	17	1
Alton, B. C.....	Westlock.....		60			168	39	124	130
Todd, H. E.....	Wetaskiwin.....		34		2	37	12	37	44
Rayment, M.....	Youngstown.....		12		16	558	40	11	4
Wenham, M.....	Yeoford.....		38		8	31	5	9	15
Totals.....			1,172	2	643	4,648	727	607	1,759
1918-19.....			6,681	5		4,288	464	694	1,410

SESSIONAL PAPER No. 25

STATEMENT showing Principal Work performed by Homestead Inspectors in Alberta and British Columbia for Departmental Year ending March 31, 1920.

Name of Homestead Inspector.	Headquarters.	Period.	Land Inspections made.	Applications for patent taken.	Miles Travelled.	
					Wagon.	Rail.
Benzie, J. M.....	Kamloops.....		349	26	5,656	2,853
Cook, H.....	Revelstoke.....		108	1	720	6,429
Cunningham, T. J.....	Edmonton.....		348	78	5,345	3,485
Doze, I. S.....	Edmonton.....		681	10	4,284	1,281
Fleming, G. W.....	Calgary.....		225	4	4,530	3,178
Fletcher, Jos.....	Grande Prairie.....		146		2,879	
Griffin, A. H.....	Edmonton.....		576	107	6,374	2,407
Grasse, P. L.....	Calgary.....		142	17	2,926	2,708
Hagen, S. C.....	Edmonton.....		577	81	5,345	1,872
Horne, J. A.....	Edmonton.....		309	26	5,895	1,425
Huntley, J. R.....	Lethbridge.....		85	5	2,425	548
Kenbry, R. A.....	Calgary.....		615	60	8,516	8,794
Key, A. E.....	Peace River.....		179	11	1,872	2,895
Magee, W. S.....	New Westminster.....	Agent.....	80		942	1,297
McConnachie, A.....	Edmonton.....		380	39	3,592	4,264
McMullen, J. E.....	Peace River.....		189	9	2,835	1,437
McCowan, H. S.....	Edmonton.....		479	40	4,804	711
McMorris, Geo.....	Edmonton.....	10 months..	376	39	3,454	1,879
Newton, T. M.....	Grande Prairie.....		201	25	5,475	520
Tempany, W.....	Calgary.....		341	9	7,796	4,583
Woodlock, P. A.....	Calgary.....		577	73	9,276	7,796
Wynne, A. E.....	Edmonton.....		289	33	6,222	1,122
Wilcox, D. E.....	Lethbridge.....	11 months..	315	52	4,864	915
Totals.....			7,567	745	106,027	62,399
1918-19.....			4,857	379	90,975	58,424

GEORGE V, A. 1921

REPORT OF THE AGENT OF DOMINION LANDS, D. J. ROSE, BATTLEFORD, SASKATCHEWAN.

STATEMENT of Business Transacted during the Fiscal Year ending March 31, 1920.

<i>Land Patents Branch—</i>	Number.	Revenue.	Total.
Homestead fees..	351	\$ 3,510 00	
Improvements..	52	1,875 68	
Land sales, cash..	23	1,611 35	
Pre-emption payments..	149	48,242 83	
Purchased homestead payments..	45	9,505 59	
Searches, map sales, office fees, etc..	303	75 75	
Applications for patent received..	462	.....
Applications for inspection received..	707	.....
Entries cancelled..	695	.....
Sundries, townsite sale..	7	107 95	
Total..			\$ 64,929 15
<i>Timber and Grazing Branch—</i>			
Timber permits..	299	\$ 823 55	
Excess timber..	36	180 90	
Timber seizure..	2	38 00	
Hay permits..	1,629	4,419 68	
Hay excess..	15	13 25	
Grazing rentals..	590	5,560 01	
Grazing assignment..	10	20 00	
Total..			11,055 39
<i>Forestry Branch—</i>			
Permit fees and rental..	285	\$ 554 62	
Timber excess..	5	9 00	
Seizures..	2	18 00	
Grazing rent..	126	1,475 10	
Trespass..	1	40 00	
Hay dues..	55	620 25	
Total..			2,716 98
<i>Mining Lands and Yukon Branch—</i>			
Mining fees..	65	\$ 266 50	
Rental..	39	12,777 34	
Total..			13,043 84
<i>School Lands Branch—</i>			
Timber permits..	2	\$ 4 00	
Timber excess..	2	8 25	
Hay sale..	2	33 50	
Hay permits..	503	980 22	
Hay permits excess..	8	18 00	
Hay permits seizure..	1	3 00	
Grazing rentals..	554	13,433 46	
Mining fees..	5	791 00	
Cultivation permits..	1	25 00	
Total..			15,296 43
<i>Miscellaneous—</i>			
Seed grain and provision repayments..	90	\$10,412 99	
Sundries..	1	2 50	
Total..			10,415 49
Grand total..			\$117,457 28

SESSIONAL PAPER No. 25

REPORT OF THE AGENT OF DOMINION LANDS, W. E. TALBOT, CALGARY, ALBERTA.

STATEMENT of Business Transacted during the Fiscal Year ending March 31, 1920.

<i>Land Patents Branch—</i>	Number.	Revenue.	Total.
Soldier grants..	327	.....
Homestead fees..	308	\$ 3,080 00	
Pre-emption fees..	7	70 00	
Improvements..	115	7,009 75	
Land sales..	41	5,276 71	
Pre-emption payments..	999	380,194 82	
Purchased homestead payments..	114	23,442 36	
Searches, etc..	1,304	444 92	
Applications for patent..	2,299	.....
Applications for cancellation..	669	.....
Entries cancelled..	506	.....
Total..			\$419,518 56
<i>Seed Grain Branch—</i>			
Seed grain and provision payments	593	\$105,811 84	
Total..			105,811 84
<i>Timber and Grazing Branch—</i>			
Ground rent..	55	\$ 5,315 10	
Royalty on sales..	23	13,129 74	
Timber permits..	209	5,744 06	
Timber seizures..	7	229 07	
Hay permits..	366	2,972 38	
Grazing rentals..	606	8,426 28	
Sundries..	12	24 00	
Total..			35,840 63
<i>Forestry Branch—</i>			
Permit fees and rental	203	\$7,410 07	
Seizures..	1	221 62	
Grazing rent..	60	8,683 31	
Hay dues..	22	169 25	
Total..			16,484 25
<i>Irrigation Branch—</i>			
Sales..	1	\$363 08	
Reservoir rental..	1	116 90	
Total..			479 98
<i>Mining Lands and Yukon Branch—</i>			
Mining fees (quartz and placer)	60	\$ 258 00	
Rental (coal)..	260	32,129 45	
Royalty..	156	12,569 55	
Petroleum and natural gas	809	85,225 24	
Domestic coal permits..	10	92 02	
Sundries..	3	1 50	
Total..			130,275 76
<i>School Lands Branch—</i>			
General sales..	10	\$ 7,653 90	
Timber permits..	9	89 40	
Hay payments..	612	3,756 55	
Grazing rentals..	1,592	46,216 84	
Coal rentals and fees..	34	1,214 15	
Coal royalty..	5	182 18	
Petroleum and natural gas..	119	11,553 88	
Total..			70,666 90
Grand total			\$779,077 92

GEORGE V, A. 1921

REPORT OF THE AGENT OF DOMINION LANDS, E. WIDMEYER, DAUPHIN, MANITOBA.

STATEMENT of Business Transacted during the Fiscal Year ending March 31, 1920.

<i>Land Patents Branch—</i>	Number.	Revenue.	Total.
Homestead fees..	723	\$7,230 00	
Improvements..	47	2,532 55	
Land sales..	28	1,708 54	
Searches..	1,029	257 50	
Application for patent..	560	.....
Application for inspection..	742	.....
Entries cancelled..	404	.....
Sundries..	1	10 00	
Total..			\$11,738 59
<i>Timber and Grazing Branch—</i>			
Timber permits..	528	\$5,103 96	
Timber seizures..	56	1,497 94	
Hay permits..	601	2,582 95	
Grazing rentals..	51	693 21	
Sundries..	1	2 00	
Total..			9,880 06
<i>Forestry Branch—</i>			
Timber permits..	2,916	\$22,415 79	
Permit fees and rental..	37	210 02	
Seizures..	73	995 50	
Grazing rentals..	142	2,719 43	
Hay dues..	332	1,864 45	
Total..			28,205 19
<i>Mining Lands and Yukon Branch—</i>			
Fees..	3	\$ 15 00	
Petroleum and gas..	182	11,230 75	
Sundries..	2	4 00	
Total..			11,249 75
<i>School Lands Branch—</i>			
General sales..	4	\$ 749 60	
Timber permits..	16	160 20	
Hay permits..	282	833 75	
Grazing rentals..	116	1,937 47	
Cultivation permits..	3	27 00	
Petroleum and gas..	19	925 00	
Total..			4,633 02
<i>Seed Grain—</i>			
Seed grain payments..	10	\$415 75	
Total..			415 75
Grand total..			\$66,122 36

SESSIONAL PAPER No. 25

REPORT OF THE ACTING AGENT OF DOMINION LANDS, J. W. MARTIN,
EDMONTON, ALBERTA.

STATEMENT of Business Transacted during the Fiscal Year ending March 31, 1920.

<i>Land Patents Branch—</i>	Number.	Revenue.	Total.
Homestead fees..	1,416	\$14,150 00	
Soldier grants..	984	.....
Improvements..	326	14,145 71	
Land sales—cash..	136	9,116 22	
Pre-emption payments..	11	2,264 57	
Purchased homestead payments..	8	1,186 81	
Searches..	565	141 25	
Applications for patent recommended ..	2,670	.....
Applications for inspection received. ..	2,246	.....
Entries cancelled..	1,903	.....
Sundries..	4	32 00	
Total..			\$ 41,036 56
<i>Timber and Grazing Branch—</i>			
Bonus..	4	\$ 8,340 16	
Ground rent..	79	10,621 98	
Royalty on sales..	53	22,200 34	
Timber permits..	1,587	21,901 96	
Timber seizures..	166	7,552 44	
Hay permits..	2,090	4,579 82	
Grazing rentals—cash..	324	2,212 60	
Sundries..	586	32,887 56	
Total..			110,296 86
<i>Forestry Branch—</i>			
Timber dues..	17	\$3,760 39	
Permit fees and rental..	37	257 83	
Seizures—grazing..	7	163 30	
Grazing rent, etc..	65	963 43	
Hay dues, etc..	46	512 05	
Total..			5,657 00
<i>Irrigation Branch—</i>			
Sales..	3	\$332 75	
Costs..	1	40 00	
Total..			372 75
<i>Mining Lands and Yukon Branch—</i>			
Mining fees..	95	\$ 361 00	
Rental..	183	27,928 85	
Royalty..	44	22,275 09	
Assessment payments..	11	947 00	
Coal permits..	5	125 00	
Sundries..	667	105,650 30	
Total..			157,287 24
<i>School Lands Branch—</i>			
General sales..	8	\$ 8,896 20	
Timber permits..	42	1,027 37	
Hay Permits..	458	1,439 55	
Grazing rentals..	779	15,187 05	
Coal rental..	9	659 25	
Cultivation permits..	4	24 93	
Sundries..	90	7,524 22	
Total..			34,758 57
<i>Miscellaneous—</i>			
Seed grain and provision repayments..	417	\$16,682 89	
Total..			16,682 89
Grand total..			<u>\$366,091 87</u>

REPORT OF THE AGENT OF DOMINION LANDS, F. L. CHRISTIE,
GRANDE PRAIRIE, ALBERTA.

STATEMENT of Business Transacted during the Fiscal Year ending March 31, 1920.

<i>Land Patents Branch—</i>	Number.	Revenue.	Total.
Homestead fees..	824	\$8,240 00	
Improvements..	60	2,927 90	
Land sales, cash..	28	1,576 50	
Searches, map sales, office fees, etc.. . .	19	4 75	
Applications for patent received.. . . .	559	.....
Applications for inspection received.. . .	368	.....
Entries cancelled..	407	.....
Soldier grants..	605	.....
Total			\$12,749 15
<i>Timber and Grazing Branch—</i>			
Bonus..	1	\$ 7 50	
Timber permits..	417	1,157 87	
Timber seizures..	2	33 64	
Hay permits..	248	599 40	
Grazing rentals, cash..	143	2,611 83	
Assignment fee..	1	2 00	
Timber excess..	47	234 76	
Hay excess..	5	5 30	
Total..			4,652 30
<i>Mining Lands and Yukon Branch—</i>			
Mining fees..	6	\$ 37 00	
Rental..	9	269 80	
Petroleum..	18	1,352 30	
Royalty..	3	17 70	
Coal permits..	1	7 50	
Sand permits..	2	5 70	
Total..			1,690 00
<i>School Lands Branch—</i>			
Hay permits..	31	\$ 40 50	
Grazing rentals..	111	3,255 61	
Total..			3,296 11
<i>Miscellaneous—</i>			
Seed grain and provision repayments.. .	76	\$5,370 75	
Total..			5,370 75
Grand total..			\$27,758 31

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REPORT OF THE AGENT OF DOMINION LANDS, W. C. COWELL. KAMLOOPS, B.C.

STATEMENT of Business Transacted during the Fiscal Year ending March 31, 1920.

<i>Land Patents Branch—</i>	Number.	Revenue.	Total.
Homesteads..	82	\$ 810 00	
Soldier grants..	7	.....
Improvements..	51	6,554 05	
Land sales..	17	2,710 94	
Ground rent..	2	35 00	
Searches, etc..	171	61 50	
Applications for patent..	106	.....
Applications for inspection..	88	.....
Entries cancelled..	48	.....
Sundries..	2	20 00	
Total..			\$10,191 49
<i>Timber and Grazing Branch—</i>			
Sale scale books..	11	\$ 94 50	
Bonus..	3	7,345 00	
Ground rent..	63	6,184 49	
Royalty on sales..	66	12,200 91	
Timber permits..	407	5,008 81	
Timber seizures..	4	235 80	
Hay permits..	12	36 00	
Grazing rentals..	505	7,109 12	
Registration fees..	31	60 00	
Improvements..	1	205 20	
Fire guarding..	8	233 88	
Total..			38,713 71
<i>Forestry Branch—</i>			
Timber dues..	16	\$1,236 29	
Permit fees..	24	6 00	
Grazing rentals..	1	85 70	
Hay dues..	18	77 75	
Total..			1,405 74
<i>Mining Lands Branch—</i>			
Mining fees..	21	\$ 110 50	
Rental..	12	1,672 45	
Total..			1,782 95
<i>Miscellaneous—</i>			
Seed grain collections..	9	\$554 33	
Total..			554 33
Grand total..			\$52,648 22

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REPORT OF THE AGENT OF DOMINION LANDS, J. A. REID, LETHBRIDGE, ALTA.

STATEMENT of Business Transacted during the Fiscal Year ending March 31, 1920.

<i>Land Patents Branch—</i>	Number.	Revenue.	Total.
Soldier grants..	115	.....
Homestead fees..	120	\$ 1,200 00	
Pre-emption fees.. . . . .	....	.....
Purchased homestead fees.. . . . .	....	.....
Improvements..	42	1,968 25	
Land sales, cash..	12	1,676 23	
Pre-emption payments..	358	126,681 62	
Searches, office fees, etc..	903	333 20	
Purchased homestead payments..	41	8,502 04	
Applications for patent received..	1,362	.....
Applications for inspection received..	278	.....
Entries cancelled..	288	.....
Sundries.. . . . .	....	.....
Total..			\$140,361 34
<i>Timber and Grazing Branch—</i>			
Timber permits..	14	\$ 20 50	
Hay permits..	56	93 70	
Grazing rentals..	1,139	24,177 72	
Improvements..	1	120 00	
Sundries..	16	37 00	
Total..			24,448 92
<i>Forestry Branch—</i>			
Timber dues..	216	\$ 1,591 02	
Permit fees and rentals..	380	1,308 28	
Seizures..	7	136 15	
Grazing rent, etc..	341	10,536 22	
Hay dues, etc..	17	65 50	
Total..			13,637 17
<i>Irrigation Branch—</i>			
Irrigation sales..	6	\$1,084 65	
Total..			1,084 65
<i>Mining Lands and Yukon Branch—</i>			
Mining fees..	49	\$ 625 00	
Rental..	56	8,015 03	
Royalty..	112	6,211 55	
Petroleum and natural gas..	262	24,228 38	
Registration fees..	5	10 00	
Total..			39,089 96
<i>School Lands Branch —</i>			
General sales..	9	\$ 2,233 51	
Hay permits..	48	35 40	
Grazing rentals..	624	21,564 37	
Mining fees..	4	20 00	
Coal rental..	4	123 85	
Coal royalty..	11	110 16	
Petroleum and natural gas..	16	1,991 85	
Sundries..	1	2 00	
Total..			26,081 14
<i>Miscellaneous—</i>			
Seed grain and provision payments..	558	\$66,125 57	
Total..			66,125 57
Grand total..			\$310,828 75

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REPORT OF THE AGENT OF DOMINION LANDS, L. P. NOEL,
MOOSEJAW, SASKATCHEWAN.

STATEMENT of Business Transacted during the Fiscal Year ending March 31, 1920.

<i>Land Patents Branch—</i>	Number.	Revenue.	Total.
Homestead fees..	227	\$ 2,270 00	
Pre-emption fees..	4	40 00	
Improvements..	77	4,128 25	
Land sales, cash..	29	2,469 95	
Pre-emption payments..	1,406	522,480 07	
Purchased homestead payments..	76	15,788 23	
Searches..	1,666	416 50	
Applications for patent received..	3,549	.....
Applications for inspection received..	1,139	.....
Entries cancelled..	345	.....
Seed grain searches..	1,167	302 25	
Total..			\$547,895 25
<i>Timber and Grazing Branch—</i>			
Timber permits..	4	\$ 11 00	
Hay permits..	782	1,606 90	
Grazing rentals, cash..	694	9,376 47	
Total			10,994 37
<i>Forestry Branch—</i>			
Surface rental..	12	\$ 60 00	
Timber dues..	146	515 60	
Permit fees and rentals..	23	83 20	
Seizures..	7	153 75	
Grazing rent, etc..	203	1,630 45	
Hay dues..	139	1,440 60	
Total..			3,883 60
<i>Mining Lands and Yukon Branch—</i>			
Mining fees..	66	\$ 247 00	
Rental..	38	1,482 50	
Royalty..	90	2,017 82	
Sundries..	12	222 00	
Total..			3,969 32
<i>School Lands Branch—</i>			
General sales..	17	\$ 7,051 78	
Timber permits..	2	5 50	
Hay permits..	622	1,429 85	
Grazing rentals..	1,092	24,346 05	
Mining fees..	2	10 00	
Coal rental..	7	139 00	
Coal royalty..	8	338 75	
Coal permits..	3	64 30	
Cultivation permits..	5	1,071 50	
Sundries..	4	55 00	
Total			34,506 73
<i>Miscellaneous—</i>			
Seed grain and provision repayment..	995	\$175,286 33	
Total			175,286 33
Grand total..			\$776,535 60

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REPORT OF THE AGENT OF DOMINION LANDS, R. M. TREEN, PRINCE ALBERT, SASKATCHEWAN.

STATEMENT of Business Transacted during the Fiscal Year ending March 31, 1920.

<i>Land Patents Branch—</i>	Number.	Revenue.	Total.
Soldier grants.. . . .	1,254	.....
Homestead fees.. . . .	921	\$9,210 00	
Improvements.. . . .	93	5,380 15	
Land sales, cash.. . . .	63	4,527 51	
Leased lots.. . . .	1	290 00	
Purchased homestead payments.. . . .	1	64 00	
Searches, map sales, office fees, etc.. . . .	267	66 75	
Applications for patent received.. . . .	1,383	.....
Applications for inspection received.. . . .	993	.....
Entries cancelled.. . . .	592	.....
Total.. . . .			\$ 19,538 41
<i>Timber and Grazing Branch—</i>			
Ground rent.. . . .	57	\$14,598 93	
Royalty on sales.. . . .	58	50,460 39	
Timber permits.. . . .	948	15,910 62	
Timber seizures.. . . .	35	4,043 06	
Hay permits.. . . .	1,153	2,780 75	
Grazing rentals, cash.. . . .	421	2,826 96	
Sundries, fire guarding.. . . .	.....	99 29	
Total.. . . .			90,720 00
<i>Forestry Branch—</i>			
Timber dues.. . . .	858	\$15,494 37	
Seizures.. . . .	10	475 80	
Grazing rent, etc.. . . .	74	989 00	
Hay dues, etc.. . . .	137	1,130 55	
Total.. . . .			18,089 72
<i>Mining Lands and Yukon Branch—</i>			
Mining fees.. . . .	53	\$434 50	
Total.. . . .			434 50
<i>School Lands Branch—</i>			
General sales.. . . .	1	\$ 592 00	
Timber permits.. . . .	48	812 72	
Hay permits.. . . .	285	587 45	
Grazing rentals.. . . .	292	6,007 87	
Coal permits, seizures.. . . .	2	441 28	
Ground rent.. . . .	6	30 40	
Total.. . . .			8,471 72
<i>Miscellaneous—</i>			
Seed grain and provision repayments.. . . .	96	\$6,358 82	
Sundries.. . . .	.....	110 25	
Total.. . . .			6,469 07
Grand total.. . . .			<u>\$143,723 42</u>

REPORT OF THE AGENT OF DOMINION LANDS, R. CRUIKSHANK,
PEACE RIVER, ALBERTA.

STATEMENT of Business Transacted during the Fiscal Year ending March 31, 1920.

<i>Land Patent's Branch—</i>	Number.	Revenue.	Total.
Homestead fees..	779	\$7,790 00	
Improvements..	54	2,226 20	
Land sales, cash..	38	2,629 80	
Searches, sales, etc..	11	2 75	
Applications for patents received.. . . .	383	.....
Applications for inspections received.. .	419	.....
Land lease..	1	3 20	
Entries cancelled..	581	.....
Soldier grants..	560	.....
Total..			\$12,651 95
<i>Timber and Grazing Branch—</i>			
Timber permits..	297	\$1,139 29	
Timber seizures..	1	106 25	
Hay permits..	431	1,793 55	
Grazing rentals..	223	3,805 38	
Totals			6,844 47
<i>Forestry Branch—</i>			
Timber permits..	3	\$ 0 75	
Hay permits..	1	3 25	
Total			4 00
<i>Mining Lands and Yukon Branch—</i>			
Quartz..	5	\$ 25 00	
Dredging..	6	300 00	
Petroleum..	600	36,582 65	
Limestone..	4	30 00	
Coal..	1	5 00	
Gravel..	4	76 55	
Total..			37,019 20
<i>School Lands—</i>			
Hay permits..	70	\$ 159 10	
Grazing rentals..	106	2,209 70	
Petroleum..	39	2,103 18	
Cultivation permits..	2	14 60	
Total..			4,486 58
<i>Miscellaneous—</i>			
Seed grain and relief payments.. . . .	46	\$3,307 41	
Total..			3,307 41
Grand total..			\$64,313 61

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REPORT OF THE AGENT OF DOMINION LANDS, T. J. WADMAN,
REVELSTOKE, B.C.

STATEMENT of Business Transacted during the Fiscal Year ending March 31, 1920.

<i>Land Patents Branch—</i>	Number.	Revenue.	Total.
Homestead fees..	8	\$ 80 00	
Soldier grants..	1	.....
Improvements..	28	2,829 05	
Land sales..	2	58 90	
Townsite payments..	6	304 63	
Purchased homestead payments.. . .	2	119 49	
Searches, map sales, etc..	92	23 20	
Applications for patent..	7	.....
Applications for inspection	7	.....
Entries cancelled..	27	.....
Sundries..	1	35 00	
Total			\$3,450 27
<i>Timber and Grazing Lands Branch—</i>			
Ground rentals..	79	\$ 5,039 59	
Royalties..	33	19,317 26	
Timber permits..	160	4,844 12	
Timber seizures..	2	659 52	
Fireguarding charges..	11	1,831 12	
Sundries..	9	11 75	
Total..			31,703 36
Grand total..			\$35,153 63

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REPORT OF THE AGENT OF DOMINION LANDS, M. A. MACINNES, SASKATOON, SASKATCHEWAN.

STATEMENT of Business Transacted during the Fiscal Year ending March 31, 1920.

<i>Land Patents Branch—</i>	Number.	Revenue.	Total.
Soldier grant entries.. . . .	273		
Homestead fees.. . . .	204	\$ 2,030 00	
Improvements.. . . .	64	2,790 15	
Land sales, cash.. . . .	63	5,931 73	
Land sales, scrip (Doukhobor sale)..	11	2,573 30	
Pre-emption payments.. . . .	410	145,335 17	
Purchased homestead payments.. .	102	22,034 72	
Searches, map sales, etc.. . . .	521	130 25	
Applications for patent.. . . .	1,676	.....
Applications for inspection.. . . .	1,013	.....
Entries cancelled.. . . .	706	.....
Sundries, seed grain statements.. .	937	264 50	
Total.. . . .			\$181,089 82
<i>Timber and Grazing Branch—</i>			
Bonus.. . . .	1	\$ 7 50	
Timber permits.. . . .	123	298 50	
Timber seizures.. . . .	4	22 00	
Hay permits.. . . .	543	1,554 15	
Grazing rentals.. . . .	141	727 37	
Sundries (excess hay).. . . .	6	26 44	
Total			2,635 96
<i>Forestry Branch—</i>			
Miscellaneous.. . . .	6	\$ 1 50	
Timber dues.. . . .	10	51 09	
Permit fees and rental.. . . .	306	1,128 06	
Seizures, hay.. . . .	61	592 08	
Grazing rent.. . . .	109	1,051 83	
Hay dues.. . . .	142	1,324 50	
Total.. . . .			4,149 06
<i>Mining Lands and Yukon Branch—</i>			
Mining fees.. . . .	23	\$ 115 00	
Cert. of work.. . . .	53	157 50	
Assignment fee.. . . .	62	124 00	
Coal permits, petroleum and gas.. .	23	6,265 57	
Sundries, power of attorney.. . .	12	24 00	
Total.. . . .			6,686 07
<i>School Lands Branch—</i>			
General sales.. . . .	11	\$ 4,898 32	
Timber permits.. . . .	3	20 75	
Hay permits.. . . .	749	1,992 75	
Grazing rentals.. . . .	1,019	19,849 07	
Mining fees, oil and gas.. . . .	3	394 70	
Cultivation permits.. . . .	15	89 25	
Sundries (excess hay).. . . .	11	28 20	
Total			27,268 04
<i>Miscellaneous—</i>			
Seed grain and provision repayments..	850	\$103,274 23	
Sundries, miscellaneous revenue.. .	2	22 40	
Total.. . . .			103,296 63
Grand total.. . . .			\$325,125 58

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REPORT OF THE AGENT OF DOMINION LANDS, S. LEE, SWIFT CURRENT, SASK.

STATEMENT of Business Transacted during the Fiscal Year ending March 31, 1920.

<i>Land Patents Branch—</i>	Number.	Revenue.	Total.
Homestead fees.. .. .	212	\$ 2,120 00	
Soldier grants.. .. .	198	.....
Purchased homestead fees.. .. .	.....	.....
Improvements.. .. .	86	5,344 00	
Land sales, cash.. .. .	17	3,366 79	
Land sales, entry.. .. .	1	10 00	
Pre-emption payments.. .. .	1,098	397,576 20	
Purchased homestead payments.. .. .	79	15,968 24	
Searches, map sales, office fees, etc.	2,804	701 00	
Applications for patents received.. .. .	4,735	.....
Applications for inspection received.. .. .	943	.....
Entries cancelled.. .. .	777	.....
Certificates of recommendation.. .. .	2,093	.....
Total.. .. .			\$425,086 23
<i>Timber and Grazing Branch—</i>			
Timber permits.. .. .	134	\$ 52 50	
Hay permits.. .. .	403	701 15	
Grazing rentals—cash.. .. .	1,424	21,123 00	
Grazing rentals, excess timber.. .. .	1	0 50	
Grazing rentals, excess hay.. .. .	7	1 90	
Registration fee.. .. .	3	6 00	
Improvements.. .. .	1	100 00	
Total.. .. .			21,985 05
<i>Forestry Branch—</i>			
Permit fees and rental.. .. .	.....	.....
Timber dues.. .. .	236	\$ 419 55	
Timber seizures.. .. .	2	4 00	
Hay seizures.. .. .	2	11 75	
Grazing rent.. .. .	274	9,453 47	
Hay dues.. .. .	42	135 00	
Total			10,023 77
<i>Irrigation Branch—</i>			
Sales.. .. .	7	\$511 20	
Total.. .. .			511 20
<i>Mining Lands and Yukon Branch—</i>			
Mining fees and potassium leases ..	21	\$ 105 00	
Rental.. .. .	9	170 25	
Royalty.. .. .	16	142 35	
Quarrying.. .. .	.....	.....
Assignments, etc	1	2 00	
Coal permits.. .. .	.....	.....
Petroleum and natural gas.. .. .	62	8,880 65	
Total.. .. .			9,300 25
<i>School Lands Branch—</i>			
General sales.. .. .	8	\$ 3,131 90	
Hay permits.. .. .	285	432 40	
Grazing rentals.. .. .	867	28,103 19	
Mining fees.. .. .	.....	.....
Hay seizures.. .. .	.....	.....
Excess hay.. .. .	1	0 30	
Registration fee.. .. .	1	2 50	
Petroleum and natural gas.. .. .	6	710 00	
Cultivation permits.. .. .	1	79 85	
Coal permits.. .. .	.....	.....
Total.. .. .			32,460 14
<i>Miscellaneous—</i>			
Seed grain and provision repayments.. .. .	922	\$176,207 82	
Total.. .. .			176,207 82
Grand total.. .. .			\$675,574 46

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There are in existence 82 timber berths, held under license to cut timber within the territory, covering an area of 169.96 square miles, which licenses were granted prior to the 10th of May, 1906, on which date the regulations governing the granting of licenses to cut such timber in the territory were rescinded, and regulations for the issue of permits to cut timber substituted therefor.

According to returns received in the department, the number of lineal feet of lumber manufactured under license during the year and sold was 900, and the number of cords of wood cut was 700. Seizure dues, amounting to \$511.71, were collected on 783.42 cords of wood cut in trespass. This does not include the very large amount of timber and cordwood cut free of dues for mining purposes.

MINING LANDS OTHER THAN COAL.

During the fiscal year 1,187 entries for quartz mining claims were granted by the mining recorders in Manitoba, Saskatchewan, and Alberta, and by the mining recorder for unorganized districts. The revenue from rentals of quartz mining claims was \$4,800.

According to the returns from the Yukon Territory during the fiscal year, 279 entries for placer mining claims, 258 entries for quartz mining claims, and 3,005 renewals and relocations were recorded. The revenue collected from these sources and from fees for registering documents in connection with mining properties was \$58,402.65.

ROYALTY AND GOLD MINED IN THE YUKON TERRITORY.

The total amount collected up to the 31st of March, 1920, for royalty on gold, the output of placer mining claims in the Yukon Territory, after deducting the exemption at one time allowed under the regulations, was \$4,754,798.83, of which amount \$41,501.12 was collected during the last fiscal year. For the purpose of estimating this royalty, the gold is valued at \$15 an ounce, which is much below its real value.

The actual value of gold produced from placer mining operations in the Yukon Territory, up to the 31st of March last, might be safely placed at \$156,903,000.

DREDGING.

Fourteen leases to dredge for minerals in the beds of rivers in the Yukon Territory are now in force, covering a total frontage of 66.04 miles. The total revenue derived from this source up to the 31st of March, 1920, amounts to \$200,824.27, of which amount \$868.19 was collected during the fiscal year just closed.

These dredging leases are confined to the Yukon, Forty-mile and Klondike rivers.

There are in operation in the Yukon Territory six dredges. These dredges are working on the Klondike river and tributaries, also on tributaries of the Indian river, and are operated by hydro-electric motive power. Two of the largest gold-saving dredges in the world are being operated most successfully on the Klondike river-flat.

Sixteen leases to dredge for minerals in the submerged beds of rivers in the provinces of Alberta and Saskatchewan are now in force, covering a total frontage of 82.19 miles. Of these leases, fifteen are in the province of Alberta and include 75 miles, and one is in the province of Saskatchewan and includes 7.19 miles. The total revenue derived from this source up to the 31st of March, 1920, amounts to \$47,727.13, of which amount \$1,090.78 was collected during the past fiscal year.

HYDRAULIC MINING.

The hydraulic mining regulations relating to the Yukon Territory were rescinded by an Order in Council dated the 2nd of February, 1904, but leases already granted were not affected by such withdrawal.

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There are still in force in the Yukon Territory five hydraulic mining leases, covering an area of 15.52 square miles. Since the Hydraulic Mining Regulations were first established in December, 1898, forty-seven hydraulic mining leases have been issued, all of which have now been cancelled, with the exception of the above number. During the year ten mines were operated by the hydraulic mining process, from which 2,220,000 cubic yards of materials were removed.

HOMESTEADS IN THE YUKON TERRITORY.

Ninety-nine homestead entries have been granted in the Yukon Territory, of which sixty-four are now in force, comprising a total area of 9,931 acres. Patents have been issued for fourteen homesteads.

PETROLEUM AND NATURAL GAS.

There are now in force under the regulations 5,138 petroleum and natural gas leases, embracing a total area of 1,713,917.87 acres, distributed as follows: In Manitoba, 110 leases, comprising 24,595.40 acres; in Saskatchewan, 104 leases, comprising 52,044.44 acres; in Alberta, 3,875 leases, comprising 1,407,015.87 acres; in British Columbia, 1,006 leases, comprising 185,596.28 acres; and in the Northwest Territories, 43 leases, comprising 44,665.88 acres. The total revenue derived from petroleum lands during the year amounts to \$371,005.59.

Natural gas has been discovered and is now being utilized for commercial and domestic purposes in different parts of the province of Alberta. Oil has been discovered, but not in large quantities. Boring operations are being carried on throughout Alberta and in Saskatchewan and the Northwest Territories, with a view to further discoveries.

QUARRYING.

The number of leases now in force, issued under the provisions of the regulations, is 247, distributed as follows: In Manitoba, 79 leases, comprising 2,406 acres; in Saskatchewan, 38 leases, comprising 1,171 acres; in Alberta, 92 leases, comprising 4,753 acres; and in British Columbia, 38 leases, comprising 1,038 acres.

The total revenue collected during the fiscal year on account of quarrying leases, including the application fees, amounts to \$9,052.87.

WATER-RIGHTS.

There are now in force in the Yukon Territory 488 grants to divert water for mining purposes, aggregating a total of 120,445 miner's inches. During the last fiscal year six water-rights were issued, comprising 700 miner's inches.

Grants were issued under regulations established by Order in Council authorizing the diversion of water in the Yukon Territory for power purposes. Up to date thirteen grants have been issued, authorizing the diversion of 131,200 miner's inches of water. Four of these grants have been permitted to lapse, but the remaining nine, authorizing the diversion of 66,200 miner's inches of water, are in good standing. Two power plants have been installed, one of which is situated on the north fork of the Klondike river, and it appears that this plant is kept in operation during the winter, the power generated being used for heating and lighting purposes in the city of Dawson. These rights are now administered under the Dominion Water Powers Act.

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COAL MINING LANDS.

The regulations authorizing the sale of coal mining lands have been rescinded and all sales made previous to the withdrawal of the regulations have been completed. The total amount of revenue received on this account was \$2,108,540.73.

COAL LEASES.

The total number of coal mining leases in force at the close of the fiscal year was 564, including a total of 227,704 acres, distributed as follows: In the province of Alberta, 486 leases, comprising 220,938 acres; in Saskatchewan, 76 leases, comprising 6,686 acres; in British Columbia, one lease, comprising 40 acres; and in the Yukon Territory, one lease, comprising 40 acres.

The total number of leases of coal mining rights issued during the year was 110, comprising 42,957 acres. The total revenue received during the year for rental of coal mining rights was \$172,961.86.

ROYALTY ON COAL.

Under the regulations governing the issue of leases to mine coal, the royalty is fixed at five cents per ton of 2,000 pounds on the merchantable output of the mine.

The following is a statement showing the amount collected on account of royalty on coal mined from lands in the western provinces, the Northwest Territories, and the Yukon Territory, respectively, during each year since the regulations came into effect:—

Year.	Alberta.	Saskatchewan.	British Columbia.	Yukon.	Northwest Territories.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1903-04.....	56 90	Nil.	Nil.	22 40	Nil.
1904-05.....	2,822 00	110 70	"	47 00	"
1905-06.....	2,379 75	47 10	"	569 33	"
1906-07.....	3,865 26	74 20	"	517 34	"
1907-08.....	7,621 67	4 30	"	1,543 38	"
1908-09.....	5,322 39	358 11	"	371 73	"
1909-10.....	153,559 98	1,672 50	3 00	136 38	"
1910-11.....	218,932 88	2,184 74	3 50	125 00	"
1911-12.....	104,894 55	2,034 74	2 78	390 00	"
1912-13.....	142,997 79	3,145 72	6 95	1,069 11	"
1913-14.....	147,198 75	2,123 43	19,35	Nil.	"
1914-15.....	104,489 77	1,880 06	4 90	"	"
1915-16.....	67,190 17	2,601 52	3 50	"	5 10
1916-17.....	149,447 82	2,228 08	8 92	"	Nil.
1917-18.....	144,634 75	4,046 55	Nil.	"	6 00
1918-19.....	175,687 66	3,193 05	"	"	Nil.
1919-20.....	181,641 80	2,573 32	"	"	"

By an Order in Council dated the 16th of March, 1918, provision was made that, owing to the scarcity of fuel in the Yukon Territory, no royalty shall be levied or collected on coal mined in that territory for a period of five years; that is, up to the 7th of April, 1923.

The total amount derived from coal mining lands on account of purchase price, rental, royalty and application fees, during the fiscal year, amounted to \$371,788.81.

During the year 1919, gold to the value of \$12,404.81 was extracted from ore taken from mineral claims in northern Manitoba, and 3,517,381 pounds of copper, valued at \$620,377.28, was obtained from ore mined in the same district.

REVENUE OF DOMINION LANDS, INCLUDING THE YUKON TERRITORY.

A.—STATEMENT of receipts on account of coal and minerals in the Provinces and Territories, also timber, hay, coal, hydraulic mining, dredging, royalty on gold, mining fees, rental of agricultural lands, water-power and water fronts and sale of Dominion lands in the Yukon Territory, for the fiscal year ended March 31, 1920:—

Quartz acreage sales.. .. \$	302 65	Free certificates, export of	
Dominion lands sales.. ..	3,555 26	gold.. .. . \$	8 00
Coal lands sales.. ..	11,311 83	Stone quarry	9,052 87
Coal mining.. .. .	3,300 00	Registration fees	105 00
Coal royalty.. .. .	184,215 12	Homestead fees	30 00
Coal rental.. .. .	172,961 86	Hay, Yukon.. .. .	55 60
Rental, Yukon	5,906 50	Interim receipt account ..	421 00
Timber dues, Yukon... ..	5,651 06	Tar sands.. .. .	509 75
Mining fees.. .. .	58,402 65	Sand, stone and gravel ..	17 00
Hydraulic leases	2,265 00	Petroleum.. .. .	371,005 59
Dredging leases, N.W.T..	1,098 78	Potash.. .. .	1,260 40
Dredging leases, Yukon ..	868 19	Quartz rental.. .. .	4,800 00
Gold export tax.. .. .	41,501 12	Sales of improvements ..	150 00

B.—STATEMENT showing the total amount of revenue collected at each agency, including the Yukon Territory, for the fiscal year ended 31st March, 1920.

Battleford.. .. . \$	13 57 88	Saskatoon.. .. .	7,484 68
Calgary	239,312 33	Swift Current.. .. .	9,822 64
Dauphin.... .. .	11,249 75	Unorganized.. .. .	3,301 50
Edmonton.. .. .	244,212 24	Winnipeg.. .. .	12,213 67
Grande Prairie.... ..	1,734 75	Dawson, Gold Commission-	
Kamloops	1,886 55	er's office... .. . \$	38,758 59
Lethbridge.. .. .	125,430 17	Dawson, C. T. office.. ..	4,516 56
Moosejaw	7,100 96	Dawson, Royalty C. office	41,393 45
New Westminster.. .. .	41,145 45	Dawson, Comp. office. ..	8 00
The Pas, Manitoba. .. .	7,479 20	Dawson, D. L. office.. ..	6,713 51
The Pas, Saskatchewan ..	3,515 00	Whitehorse, Min. Rec. office	1,956 50
Peace River.. .. .	51,892 63	Whitehorse, C. T. office..	1,190 10
Prince Albert.. .. .	434 50	Whitehorse, R. C. office ..	107 67
Revelstoke... .. .	6 70	Whitehorse. Dom. L. office	2,824 25

REPORT OF THE GOLD COMMISSIONER, DAWSON.

The total revenue of the office for the year was \$38,162.96, exclusive of rentals paid direct to the department at Ottawa.

A large number of claims, both placer and quartz, are still held free from cancellation owing to the fact that the owners were on military service. When these claims are again brought under the provisions of the Yukon Placer Mining Act or the Quartz Regulations as the case may be, a considerable increase of revenue will result.

PLACER GOLD MINING.

110,693.65 ounces of gold were mined and exported from the territory during the year. Gold production continues to be seriously affected by the abnormal conditions. The cost of production has increased enormously and the value of the product remains stationary.

There are large areas of auriferous gravels which could be profitably mined under more favourable conditions, but which cannot be mined under existing conditions.

Experiments were conducted during the year by both the Yukon Gold Company and the North West Corporation, Limited, with what is known as cold water thawing. As a result of these experiments both companies will, during the present season, thaw

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their gravels by this process, which consists of introducing water under moderate pressure into the gravels by means of the ordinary points. The water is of course of considerably higher temperature than the frozen gravels and the resultant loss of heat units removes the frost from the gravels in a remarkably short time, although not as quickly as by means of steam.

YUKON GOLD COMPANY.

This company continues to hold first place as a producer. Three dredges were operated continuously during the dredging season of 140 days from May 17 to October 5; particulars as follows:—

Number of dredges and capacity of each.

No.	Make.	Capacity of Buckets.	Located on
1.	Bucyrus..	5 cu. ft.	Klondike river claims 12 to 15 and lot 90.
4.	Marion...	7 cu. ft.	Claims 57 to 59 below Hunker Creek.
6.	Bucyrus..	7 cu. ft.	Claims 17 to 23 Gold Run creek.

A total of 1,959,000 cubic yards of material was removed.

The daily average number of men employed by the company was as follows:—

Hydraulic mines (April to October)	53
Dredges and thawing (April to October)	100
Ditch (April to October)	25
Otherwise employed	59
Total	<hr/> 237 <hr/>

There were ten hydraulic mines in operation at various times during the summer at the following points:—Bunker Hill, Oro Fino Hill, Trail Gulch, Jackson Gulch, Cheechaco Hill, Fox Gulch, American Gulch, Adams Hill, Monte Cristo, Lovett Hosford. A total of 2,220,000 yards of material was removed.

The power to operate the dredges was furnished by the company's hydro-electric plant situated on the Twelve Mile river.

CANADIAN KLONDIKE MINING COMPANY, LIMITED.

The company's pumping plant near the mouth of Hunker creek was operated continuously for 151 days from May 10 to October 10. This plant is operated by power furnished by the hydro-electric plant at the North fork of the Klondike river and pumps Klondike water from near the mouth of Hunker creek, where it is conveyed by gravity to the hills on the left limit of Hunker creek, thence it is conveyed by ditch to hills and benches on Last Chance creek where it is used in hydraulic mining operations.

NUMBER OF DREDGE AND CAPACITY OF EACH.

No.	Capacity	Location
Canadian No. 1..	7½ cu. ft.	Hunker creek.
Canadian No. 2..	17 cu. ft.	Klondike valley, lease 18.
Canadian No. 4..	17 cu. ft.	Klondike valley, lease 18.

Canadian No. 1 operated 101 days from June 16 to September 24 and during that period dredged 179,182 cubic yards of material, employing an average of 20 men.

Canadian No. 2 operated 189 days from July 14 to November 28, and during that period dredged 194,837 cubic yards of material, employing an average of 30 men.

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Canadian No. 4 operated continuously through the winter season, shutting down for repairs on April 3. Operations were recommenced on May 12 and continued to November 23, making a total operating season of 289 days, and during that period dredged 2,032,867 cubic yards of gravel, employing an average of 30 men.

These dredges are all electrically driven, power being furnished by the company's hydro-electric plant at the north fork of the Klondyke river.

NORTH WEST CORPORATION, LIMITED.

This company, which is now under the same management as the Canadian Klondyke Mining Company, Limited, continued prospecting and preparatory work on their large holdings on Dominion, Sulphur and Indian creeks; 1,017 claims were represented and renewed. The work performed consisted of sinking 87 prospecting shafts on Upper Dominion and 36 on Lower Dominion; sluicing by means of water under pressure, 246,000 cubic yards of muck overlying gold-bearing gravels on Lower Dominion and 75,025 cubic yards on Quartz creek.

Dredge Canadian No. 1, which was operated by the Canadian Klondyke Mining Company on Upper Hunker creek, was dismantled at the close of the season and during the past winter was hauled to 20 below Lower Discovery Dominion, where it will be reassembled and operated during the coming season.

OTHER PLACER OPERATIONS.

Ordinary individual operations were carried on on about the same scale as the previous year on practically all the well-known creeks in the Klondyke, Indian River and Sixty-mile watersheds. A large number of outfits engaged in hydraulic operations or open-cutting in the summer and drifting operations in the winter.

Thistle and Kirkman creek, tributaries of the Yukon, Black Hills, Scroggie and Barker, tributaries of the Lower Stewart, continue to be producers in a small way.

In the Upper Stewart District operations were carried on on Haggart, Highet and Duncan creeks. A local company purchased a dredge formerly operated on the Stewart river near the mouth of the McQuesten and had the same taken by the river to Mayo where it was dismantled, hauled to Highet creek and reassembled and will be operated there during the coming year.

LODE MINING.

In the Dawson District very little prospecting or development work has been done except on the silver-lead properties on Lookout mountain and Keno hill in what was formerly the Duncan Mining District.

The Yukon Silver Lead Company, Limited, continued development work on their groups of claims on Lookout mountain. A trial shipment of 100 tons of ore was hauled to Mayo for shipment on the opening of navigation.

A rich outcropping of silver-lead ore was discovered in July last by Louis Bouvette on what is now known as Keno hill, situate near the head of Crystal and Lightning creeks, and some 250 claims have since been located in that locality.

The Yukon Gold Company had their engineer investigate the field and on the strength of his report secured working options on Discovery and several other claims adjoining. Twelve men were immediately put to work and development work has been carried on vigorously throughout the winter and preparations have been made to continue. A considerable tonnage of ore is in sight and although sufficient depth has not yet been attained to speak with assurance, the indications are most favourable.

Considerable work has also been done by Messrs. Mackay and Erickson on their properties on the same hill, and a number of other claims in that vicinity will be prospected during the coming summer.

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YUKON COUNCIL.

The Yukon Council was in session from May 5 to May 23, both dates inclusive. Fourteen ordinances or amendments to existing ordinances were enacted.

An Ordinance was passed vesting the authority formerly in the City Council of Dawson, in the commissioner; this was necessary on account of the reduction in the size of the council.

Ordinances were passed making provision for an export tax on fur and for a Crown grant tax on mineral claims not operated.

The former Election Ordinance was repealed and a new Ordinance enacted providing for simpler and less expensive election machinery. Under the provisions of this Ordinance an election was held on the 25th February last and the following members elected to the Yukon Council: For Dawson District, Mr. Gavin Fowlie; Klondyke District, Mr. Paul S. Hogan, and for Whitehorse District, Mr. Robert Lowe. At the same time a plebiscite was held in regard to the mode of regulating the liquor traffic. The result of this plebiscite was a majority of 33 against the sale of liquor for beverage purposes.

An Ordinance also was passed terminating all liquor licenses on the 31st August and giving the commissioner authority to take over stocks of liquor then in the territory and providing for the sale of the same under Government control.

HOSPITALS AND PUBLIC HEALTH.

St. Mary's Hospital at Dawson and the General Hospital at Whitehorse, both of which institutions receive Government assistance, met all requirements in their respective localities during the year. The general health of the territory has been good.

ROYAL CANADIAN MOUNTED POLICE.

The police have given their usual adequate service and order has been well maintained.

REPORT OF THE CROWN TIMBER AND LAND AGENT, DAWSON.

The total revenue of the office for the year was \$10,779.45, which, compared with the previous year, is a net increase of \$2,113.88 in the lands branch and a net decrease of \$1,904.57 in the timber branch.

WOOD AND TIMBER.

Seventy-seven permits were issued during the year, under authority of which 10,439 cords of wood were cut. Seizure dues were paid on 264 cords of wood. 700 cords of wood and 900 lineal feet of piling were cut under license.

COAL.

The Five Fingers Coal Company operated their mine at Tantalus and shipped to Dawson sufficient coal to meet all requirements.

REPORT OF INSPECTING ENGINEER OF MINES, O. S. FINNIE.

The output of coal in the province of Alberta for the year 1919, was somewhat less than during the previous year owing mainly to a strike of several months' duration of the miners of District 18.

The output for the province of Saskatchewan for 1919, so far as royalty coal is concerned, was approximately the same as the previous year.

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For purposes of comparison the schedule below indicates the output of these provinces for two years, 1918 and 1919. The output is divided into three classes, viz., coal subject to royalty from Dominion lands, coal subject to royalty from school lands and coal not subject to royalty:—

Province.	Calendar Year.	Output Subject to Royalty.		Output Not Subject to Royalty.	Total Output.
		Dom. Lands.	School Lands.		
Alberta.....	1918	2,984,882	383,465	2,758,096	6,126,443
Saskatchewan.....	1918	60,299	6,043	282,646	348,988
Alberta.....	1919	2,601,807	271,091	2,131,370	5,004,268
Saskatchewan.....	1919	43,037	22,062	319,018	384,117

It will be observed that the quantity of coal subject to royalty tax is not materially greater than that not subject to tax. This is accounted for by the fact that royalty is not levied on unmerchantable slack or on coal consumed under boilers at mines or coal taken from road allowances. Neither is it exacted on mines located on Hudson's Bay lands or lands given as subsidies to railways or lands disposed of prior to the introduction of royalty.

The following schedule indicates the total number of coal mines operated during 1918 and 1919, also those which are subject to royalty and those which are not:—

Province.	Calendar Year.	Number of Operating Coal Mines.			
		Subject to Royalty.		Not Subject to Royalty.	Total.
		On Dominion Lands.	On School Lands.		
Alberta.....	1918	192	19	49	260
Saskatchewan.....	1918	52	10	5	67
Alberta.....	1919	176	10	69	255
Saskatchewan.....	1919	55	6	3	64

Practically all coal mines subject to royalty were inspected during the year.

In August, 1919, an investigation was made of the coal deposits of the Smoky River District. Large and extensive seams of high grade bituminous coal were found. This coal is especially adapted for steam purposes and in view of the fact that the National System of Railways would at some future time require a coal supply of its own, a report was submitted recommending the withdrawal of townships 55, 56, 57, 58 and 59, ranges 7, 8 and 9, west of the 6th meridian, from disposal under the Coal Mining Regulations. This recommendation was duly approved and an Order in Council withdrawing these lands was passed on the 6th October, 1919. This area of 540 square miles is now set apart as a national coal reserve.

During the year a dispute arose regarding the priority of right between certain applicants for coal rights in township 47, range 20, west of the 5th meridian. It was found impossible with the information at the disposal of the department to determine with certainty the rights to which the respective applicants were entitled. The writer was appointed a commissioner to conduct an investigation under oath with authority to summon witnesses by subpoena and to compel the production of documents and papers. A thorough examination and survey of the disputed area was made early in September and the hearing took place at the Macdonald hotel in Edmonton on the 22nd and 23rd of that month. Both sides were represented by counsel and many witnesses were heard. The evidence was taken by a court stenographer. Eventually an

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award was issued and approved by the minister. We now have on file statements from counsel on both sides expressing their complete satisfaction with the terms of the award.

Two mining inspectors are located permanently in the west. Their office is in the Dominion Bank building, Calgary, where they make their headquarters. During the year about 250 mines were inspected and reported on, 31 surveys made, 36 plans compiled and about 125 additional plans received and examined.

Owing to activity in the petroleum and natural gas industry in the west and to the number of wells which were being put down in a defective and unsatisfactory manner, it was considered advisable to ask for the appointment of an officer to be known as a petroleum engineer, who, under the direction of the inspecting engineer, would exercise supervision over the sinking of oil and gas wells, and, so far as the practical side was concerned, see that the Petroleum Regulations were being properly complied with.

The position was duly advertised in the *Canada Gazette* and eventually the Civil Service Commission confirmed the appointment of Mr. S. E. Slipper, who was then in private practice. He was formerly with the Geological Survey of Canada for a period of seven or eight years. Mr. Slipper assumed office in August, 1919. His headquarters are in the Dominion Bank building, Calgary. His duties might be summed up under the following headings:—

1. Inspecting drilling operations in the various oil and gas fields.
2. Reporting on the waste of natural gas from wells drilled on leases administered by the Federal Government.
3. Reporting on defective wells in which injurious water has not been excluded from the oil and gas formations.
4. Reporting on condition of abandoned wells.
5. The systematic testing of the volumes and pressure of gas wells.
6. Supervising the capping of gas wells out of control.
7. Seeing that the provisions of the Petroleum and Natural Gas Regulations and particularly section 29 thereof are strictly complied with.

The petroleum engineer has inspected and furnished reports on the following fields:—

PEACE RIVER FIELD.

The heavy oil and natural gas horizon at the base of the cretaceous (that is at 900 feet depth more or less) has been penetrated by five wells though it has not yet been tested for production, the reason being that two very heavy flows of water are encountered near or actually in the same sandstones as that in which the oil and gas occur. Up to the date of writing none of the wells has successfully controlled this enormous flow of water, so that the possibilities of the known oil sands have not yet been determined. It is hoped that the water will be successfully cased off during the coming summer and steps taken to test the already discovered oil horizon and also to drill deeper to test the underlying limestone series.

CALGARY OIL-FIELD.

An investigation of the Okotoks oil-field was undertaken. In this field a gasolene extraction plant of the absorption type is operating for the purpose of extracting gasolene from the natural gas produced by two wells in the field. The extraction plant is licensed under patents controlled by the Hope Natural Gas Company of Pittsburg. The amount of high gravity gasolene produced by the plant varies from 500 to 700 gallons per day and the residual gas going to waste is about 2,000,000 cubic feet daily. Early in the year a new but very small production was reported by a well in section 12, township 20, range 3, west of the 5th meridian. The severe winter caused practically all operations to cease.

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BOW ISLAND GAS FIELD.

This field supplies gas to Calgary, Lethbridge and smaller places, but the supply is rapidly declining. The gas company have been diligently carrying on exploratory drilling in new fields in the vicinity of Burdette and Monarch but except for a small supply at Burdette have had little success.

THE MEDICINE HAT FIELD.

This field which still has considerable vigour is nevertheless showing the usual indications of a declining yield. The pressure now is about 100 pounds less than the original pressure. Investigations being carried on will indicate the probable remaining life of this field. The petroleum engineer is supervising the difficult operation of closing in the Canada Cement Well No. 5. Many attempts have been made to control this well during the past five years without success.

VIKING GAS FIELD.

In the gas field north of Viking, Alberta, nine wells have been drilled and operations are now being carried on on the tenth well.

A natural gas discovery of considerable promise was made near Irma, Alberta, on section 4, township 45, range 8, west of the 4th meridian. Here, the well of the Viking and Battle Creek Oil Company brought in a 6,000,000 cubic feet per day open flow at a depth of 1,900 feet. The closed pressure was some 650 pounds.

Gas wells of minor importance were inspected at Ponoka and Wetaskiwin.

The Northwest Company are extending the exploratory drilling that was begun last year. At present this company have drills in operation at Fort Norman on the MacKenzie, at Windy Point on Great Slave lake, in the neighbourhood of Czar, Alberta, section 17, township 39, range 7, west of the 4th meridian, also in section 14, township 4, range 30, west of the 4th meridian, and in section 29, township 14, range 2, west of the 5th meridian.

REPORT OF THE CONTROLLER, TIMBER AND GRAZING LANDS
BRANCH, B. L. YORK.

The total revenue derived from timber, grazing and hay lands during the fiscal year amounts to \$687,401.83. This is an increase of \$170,463.30 over the revenue for the past year, or about 33 per cent.

TIMBER.

At the conclusion of this report will be found statements A, B and C, showing the total revenue, the revenue from timber by agencies, and other sources of revenue by agencies.

Statements from the Crown Timber Agents at Calgary, Edmonton, Prince Albert, Winnipeg, Kamloops, New Westminster, and Revelstoke showing the revenue collected from Dominion Lands within their respective agencies, and other information, are appended hereto.

The report of the Inspector of Crown Timber Agencies and the reports of the Inspectors of Ranches located at Calgary, Moosejaw and Prince Albert, are also attached.

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The revenue from timber, grazing and hay lands received at the Crown timber agencies, also the number of mills operated and berths held under license, and the number of portable saw-mills in operation, are as follows:—

Agency.	Total Revenue.	No. of Mills operating under license.	No. of Mills operating under permit. .
Calgary..	\$ 45,521 18	11	9
Edmonton..	111,160 63	21	74
Prince Albert..	92,052 49	17	29
Winnipeg..	95,548 62	30	54
Kamloops..	39,653 78	6	—
New Westminster	130,873 72	27	—
Revelstoke..	31,718 36	7	—

The return of operations received from the timber agencies show the quantity of timber manufactured and sold under license to be as follows:—

	Manufactured	Sold
Sawn lumber..	231,357,170	220,666,218
Railway ties..	438,864	109,789
Laths..	16,846,958	30,282,685
Shingles..	47,000	26,000
Shingle bolts..	54,358	47,547
Piling, lineal feet	46,056	5,000
Telegraph poles, lineal feet..	56,089	—
Cribbing, lineal feet..	17,623	—
Mining timber, lineal feet..	2,282,125	—
Mine props, lineal feet	227,730	35,061
Fence posts, round..	88,034	—
Fence posts, split..	337,619	—
Cordwood..	2,169	1,631

The following shows the material manufactured on permit and portable saw-mill berths and the quantity sold:—

	Manufactured	Sold
Lumber, feet B.M..	40,858,612	39,604,990
Shingles..	393,825	329,825
Shingle bolts..	8,488	—
Laths..	89,300	89,300
Railway ties..	128,941	—
Mining timber, lineal feet..	532,336	2,398,201
Piling and telegraph poles, lineal feet	101,189	—
Fence posts..	769,636	15,807

The quantity of lumber manufactured and sold within each agency will be found in the agent's report appended hereto.

The area of timber lands held under license and permit in the provinces of Manitoba, Saskatchewan, Alberta, and British Columbia, is as follows:—

	Under License. Square Miles.	Under Permit. Square Miles.
Manitoba..	1,078.62	434.61
Saskatchewan..	1,525.14	127.48
Alberta..	1,930.89	97.92
British Columbia..	1,784.30	4.87
	<hr/> 6,318.95	<hr/> 664.88

During the year 129 berths were granted, of which four were license berths, twenty-six permit berths, forty-four cordwood berths and fifty-five portable saw-mill berths. This is an increase of thirty-three berths over the number granted during the previous year.

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GRAZING.

There were in force on March 31, 1920, 6,105 grazing leases, covering an area of 6,498,748 acres, as follows:—

	Acres.
Manitoba..	126,679
Saskatchewan..	2,869,084
Alberta..	3,095,955
British Columbia..	407,030
	<hr/>
	6,498,748

This is an increase of 330,453 acres over the previous year.
During the year 506 new leases were issued.

STATEMENT "A."—Statement of Revenue for Fiscal Year 1919-20.

Timber..	\$506,478 50
Grazing..	135,718 81
Hay..	27,763 74
Registration..	317 33
Fire tax..	9,710 88
Improvements..	1,060 20
Scaling fees..	6,259 12
Scaling books..	98 25
	<hr/>
Total..	\$687,401 83

STATEMENT "B."—Statement of Revenue from Timber for Fiscal Year 1919-20.

Bonus under license..	\$ 26,471 89
Rental under license..	92,323 56
Royalty under license..	200,823 68
Permit fees, dues and rental..	156,404 52
Seizures..	30,449 85
Scaling fees..	6,259 12
Scaling books..	98 25
	<hr/>
Total..	\$512,830 87

STATEMENT "C."—Statement of Revenue from Grazing, Hay, Registration Fees, Fire-guarding Dues, and Improvements for Fiscal Year 1919-20.

Grazing..	\$135,718 81
Hay..	27,763 74
Registration fees..	317 33
Fire tax..	2,469 04
Improvements..	1,060 20
	<hr/>
Total..	\$167,329 12
Fire tax collected at head office..	7,241 84
	<hr/>
	\$174,570 96

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CHIEF INSPECTOR OF DOMINION CROWN TIMBER OFFICES,
E. F. STEPHENSON.

STATEMENT "A."—Summary of work performed and Revenue collected in the respective Crown Timber Offices, during the Year ended March 31, 1920.

Agency.	Timber and grazing.							Forestry.				School lands.					Revenue.	
	Bonus.	Ground rent.	Royalty on sales.	Timber permits issued.	Timber seizures.	Hay permits.	Grazing rentals.	Sundries.	Permit dues and rentals.	Seizures.	Grazing rentals.	Hay permits.	Timber permits issued.	Seizures.	Hay permits.	Grazing permits.		Sundries.
																		\$
Battleford.....				294	2	1,629	590	61	285	2	126	55	2		503	554	13	28,252 80
Calgary.....		55	23	209	7	366	606	12	184	1	60	22	9		612	1,592		102,365 77
Dauphin.....				528	56	601	51	1	2,953	73	142	332	16		282	116		31,036 77
Edmonton.....	4	79	53	1,587	166	2,090	324	586	54	7	65	46	42		458	779	90	141,132 05
Grande Prairie...				417	2	248	143	53							31	111		7,953 41
Kamloops.....	3	63	66	317	4	12	505	43	40		1	18						40,119 45
Lethbridge.....				14		56	1,139	17	596	7	341	17			48	624		59,685 86
Moosejaw.....				4		963	694		181	7	203	139	2		676	1,092		40,659 37
New Westminster	12	198	400	152	21		1	440										128,137 72
Peace River.....				297	1	431	223								70	106		9,213 27
Prince Albert.....		37	58	948	35	1,153	421		853	1	74	137	48	2	285	292		116,659 04
Revelstoke.....		79	33	160	2			20										31,703 36
Saskatoon.....				123	4	543	141	6	316	61	109	142	3		749	1,019	11	28,670 79
Swift Current.....				134		403	1,424	12	236	4	274	42			285	867	1	60,544 71
Winnipeg.....	1	60	51	1,631	86	1,346		271	112	2	187	141	67	5	827			97,553 75
Total.....	20	571	684	6,815	386	98,41	6,262	1,522	5,810	174	1,582	1,091	189	7	4,826	7,152	115	923,688 12
Previous year.....	17	492	452	6,446	322	6,347	5,192	1,279	4,389	127	1,227	1,285	207	22	5,738	5,033	120	589,314 82

N.B.—(Revenue exclusive of payments made to department on account of the respective agencies.)

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STATEMENT "B" showing manufacture and sale of Timber Products cut by Holders license and permit during the

Agency.	Lumber ft. b.m.			Lath.		
	Manf'd.	Marketed.	On hand.	Manf'd.	Sold.	On hand.
Calgary.....	14,042,328	14,507,701	4,285,327	262,339	.....	318,915
Edmonton.....	21,034,727	22,626,800	2,938,412	2,718,700	2,718,700	.....
Kamloops.....	24,295,065	24,295,065	.....	.....	.....	.....
New Westminster.....	77,977,270	50,000,000	27,977,270	.....	.....	.....
Prince Albert.....	56,103,853	74,767,080	11,457,985	11,329,700	24,019,815	566,265
Revelstoke.....	21,642,307	21,642,307	.....	.....	.....	.....
Winnipeg.....	16,261,620	18,787,367	3,975,399	2,798,558	3,544,170	.....
Total.....	231,357,170	226,626,320	50,634,393	17,109,297	30,282,685	885,180

PERMIT

Calgary.....	900,975	1,353,375	263,051	.....	.....	.....
Edmonton.....	13,732,303	13,599,567	2,991,157	49,500	49,500	.....
Kamloops.....	11,164,155	11,164,155	.....	.....	.....	.....
New Westminster.....	8,095,994	8,095,994	.....	.....	.....	.....
Prince Albert.....	2,906,153	2,135,874	1,667,703	39,800	39,800	.....
Revelstoke.....	1,237,000	1,237,000	.....	.....	.....	.....
Winnipeg.....	2,412,191	709,921	1,898,608	.....	.....	.....
Total.....	40,448,771	38,295,886	6,820,519	89,300	89,300	.....

PERMIT—

Above agencies	100,369,615	.....	.....	.....	.....	.....
Grand total.....	372,175,556	264,922,206	57,454,912	17,198,597	30,371,985	885,180
Previous year.....	328,807,892	321,036,304	56,500,516	31,871,850	25,468,170	14,416,692

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of Timber Berths on Dominion Lands, Forestry, and School Lands, under yearly Fiscal Year ended March 31, 1920.

Railway ties.	Shingles.		Piling and mining props.	Saw-logs.			Fence posts.
	Manf'd sold.	Bolts cords.	Sold lin. ft.	Pcs. cut.	Manf'd.	On hand.	
262,339	.....	.....	2,351,859	402,311	319,193	383,111	.....
117,112	47,000	.....	205,660	157,391	342,419	114,365	.....
18,178	.....	1,364	24,676	241,563	241,563	.....	82,708
150	.....	47,400	41,265	108,104	166,634	3,423	.....
6,171	.....	.....	.....	1,340,750	905,808	1,476,744	.....
1,813	.....	5,594	13,257	201,028	201,028	.....	382,944
33,101	.....	.....	.....	599,067	309,416	531,532	.....
438,864	47,000	54,358	2,636,717	3,050,214	2,426,062	2,509,175	465,652

BERTHS

.....	.....	.....	459,986	66,661	94,749	34,885	.....
25,119	393,825	.....	32,000	229,065	231,801	113,077	14,607
67,980	.....	203	112,971	Not known.	.....	.....	388,729
11,750	.....	6,915	10,150	Not known.	.....	.....	200
883	.....	.....	.....	110,970	57,707	59,701	.....
14,500	.....	1,370	19,186	Not known.	.....	.....	366,100
8,709	.....	.....	.....	140,065	42,095	98,245	.....
127,951	393,825	8,488	634,293	546,761	426,352	305,908	769,636

SEE STATEMENT "C."

582,721	.....	11,144	1,608,000	Not known.	.....	.....	2,,248236
1,149,536	440,825	73,990	4,879,010	3,596,975	2,852,414	2,815,083	3,483,524
1,023,154	22,000	37,871	4,233,580	2,697,325	3,998,819	2,187,409	1,428,584

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STATEMENT "C."—Timber Material covered by Permits issued at the respective Agencies, principally to Settlers during the Year ending March 31, 1920.

Agency.	Lumber and logs.	Fence rails.	Poles.	Fence posts.	Cords cord- wood.	Railway ties.	Tele- graph, and tel. poles.	Round timber	Cords shingle bolts.
	Ft. b.m.							lin. ft.	
Battleford.....	1,846,962	51,255	9,960	36,417	2,298				
Calgary.....	1,852,190	36,580	5,460	91,737	6,206	1,030	2,500	588,656	
Dauphin.....	7,766,409	6,632		81,134	14,746	1,000			
Edmonton.....	22,040,515	1,074,500	204,864	271,774	2,469	320,311	73,522	841,244	
Grande Prairie..	5,190,187	380,670	913,384	106,993	171				
Kamloops.....	11,325,435	9,650	1,436	392,227	6,453	67,980	20,146	40,975	205
Lethbridge.....	1,779,193	1,445	9,549	35,964	23,820			54,500	
Moosejaw.....	51,210	2,200	665	20,020	200				
N'w Westm'ster	8,463,473			200	188	12,060			9,569
Peace River....	1,937,929	364,300	72,490	96,775	1,703				
Prince Albert...	22,777,626	72,096	43,093	382,440	34,403	8,340	100	64,000	
Revelstoke.....	1,294,558			366,100	1,170	14,500	20		1,370
Saskatoon.....	1,192,001	1,350	1,240	12,577	2,552				
Swift Current...	153,930	38,600	28,110	43,535	3,123				
Winnipeg.....	12,697,997	28,840	16,230	310,343	52,846	157,500	5,650	18,625	
Totals.....	100,369,615	2,068,118	1,306,481	2,248,236	152,348	582,721	101,938	1,608,000	11,144
Previous year	52,355,777	1,650,294	509,562	1,553,588	154,747	463,436	64,065	1,305,378	6,514

STATEMENT "D" showing the number of Hay Permits issued at the respective Crown Timber Offices and the amount of hay covered thereby for the year ended March 31, 1920.

Agency.	Dominion Lands.		School Lands.		Forestry Lands.		Revenue from hay.
	Permits issued.	Tons hay.	Permits issued.	Tons hay.	Permits issued.	Tons hay.	
Battleford.....	1,629	32,828	503	6,893	55	2,325	6,051 40
Calgary.....	366	8,111	587	12,309	22	718	6,898 18
Dauphin.....	601	12,567	282	3,968	332	9,010	5,281 15
Edmonton.....	2,075	29,910	727	8,693	45	2,203	6,531 42
Grande Prairie.....	248	4,080	31	625			639 90
Kamloops.....	13	80			162	19	113 75
Lethbridge.....	55	1,553	48	570	16	280	194 60
Moosejaw.....	963	12,840	676	11,808	114	5,101	4,477 35
New Westminster..							
Peace River.....	431	12,903	70	1,208	1	12	1,955 90
Prince Albert.....	1,153	14,487	285	3,725	137	4,700	4,498 75
Revelstoke.....							
Saskatoon.....	543	10,682	749	14,278	142	6,823	5,486 68
Swift Current.....	403	13,122	285	5,462	42	510	849 80
Winnipeg.....	1,346	23,034	827	11,121	141	2,452	6,417 06
Total.....	9,826	176,197	5,070	80,660	1,209	34,153	49,395 94
Previous year.....	6,213	117,472	5,477	98,034	1,353	41,752	35,224 92

SCHOOL LANDS DIVISION—W. T. ROLLINS.

Representations having been made to the minister by the officials of the Soldiers Settlement Board that undisposed of school lands should be made available for purchase by the board under the provisions of section eleven of the Soldiers Settlement Act of 1919, it was decided to indefinitely postpone the holding of all auction sales of school lands contemplated for the fiscal year. Consequently only a few small parcels were disposed of for railway right of way and for school site purposes.

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The approximate net area disposed of down to March 31, 1920, after making deductions for cancelled sales, etc., was as follows:—

Province.	Area.	Value.	Average.
Manitoba	672,636.01 ac.	\$ 6,473,784 67	\$ 9 62
Saskatchewan.. .. .	1,442,240 23 "	26,252,405 81	18 20
Alberta... .. .	869,730.48 "	11,563,174 37	13 30

The value of town lots disposed of down to same date was as follows:—

Manitoba... .. .	\$ 4,808 49
Saskatchewan.. .. .	13,885 00
Alberta... .. .	41,546 00

GRAZING.

By amendment to the grazing regulations authorized by Order in Council dated the 15th December, 1919, provision was made to increase the rate of rental on grazing permits from four to ten cents per acre in the provinces of Saskatchewan and Alberta and from six to ten cents per acre in the province of Manitoba.

The following statement shows the number of permits and leases issued, the number of leases in good standing and the revenue derived on account of same from the three provinces for the fiscal year:—

	Permits issued.	Leases issued.	Leases in good standing	Revenue derived.
Grazing.. .. .	7,403	.....	.....	\$202,045 11
Coal.. .. .	.....	16	82	29,698 34
Petroleum and gas.. .. .	.....	229	305	26,288 37
Potash.. .. .	.....	.....	2	161 85
Fire clay.. .. .	.....	.....	2	—
Hay.. .. .	5,032	15	24	10,791 29
Cultivation	56	.....	.....	840 65
Timber.. .. .	186	.....	.....	7,402 17
Special.. .. .	.....	6	14	853 99

Registration Fees.—During the fiscal year the revenue derived from this source for the three provinces was \$1,851.

Statements herewith lettered A, B, C, respectively, show the revenue collected from the provinces of Manitoba, Saskatchewan and Alberta duly classified.

The total net revenue derived from the three provinces for the fiscal year was as follows:—

Manitoba... .. .	\$ 663,039 84
Saskatchewan.. .. .	2,190,673 17
Alberta... .. .	1,017,830 80
Total.. .. .	<u>\$3,871,543 81</u>

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As provided for by several Orders in Council in that behalf the revenue collected from each province for the fiscal year, less principal moneys of sales and less expenditure, was paid over to the Government of the province. The amounts paid were as follows:—

Manitoba—	
Revenue other than principal moneys.. . . .	\$282,510 64
Less expenditure.. . . .	14,759 64
Amount paid to province.. . . .	<u>\$267,751 00</u>
Saskatchewan—	
Revenue other than principal moneys.. . . .	\$873,671 73
Less expenditure.. . . .	38,475 69
Amount paid to province.. . . .	<u>\$835,196 04</u>
Alberta—	
Revenue other than principal moneys.. . . .	\$444,699 69
Less expenditure.. . . .	26,245 71
Amount paid to province.. . . .	<u>\$418,453 98</u>

Statements herewith lettered D, E, F, respectively, show the balance standing to the credit of the School Lands Fund for each province as on March 31, 1920, after deducting amounts invested in Dominion of Canada debenture stock as provided for by Order in Council dated December 1, 1919.

Manitoba—	
Total amount at credit of fund.. . . .	\$5,181,774 29
Amount invested in debenture stock.. . . .	5,181,000 00
Balance at credit of fund.. . . .	<u>\$ 774 29</u>
Saskatchewan—	
Total amount at credit of fund.. . . .	\$8,830,838 33
Amount invested in debenture stock.. . . .	8,830,000 00
Balance at credit of fund.. . . .	<u>\$ 838 33</u>
Alberta—	
Total amount at credit of fund.. . . .	\$5,331,189 54
Amount invested in debenture stock.. . . .	5,331,000 00
Balance at credit of fund.. . . .	<u>\$ 189 54</u>

The following is an approximate statement of work performed by School Lands Branch during the fiscal year:—

Leases prepared in duplicate.. . . .	268
Statements of account rendered in duplicate.. . . .	14,000
Receipts issued in quadruplicate.. . . .	7,671
Grazing permits issued in quadruplicate.. . . .	7,403
Cultivation permits issued in duplicate.. . . .	56
Assignments registered.. . . .	857
Requisitions for refunds prepared in duplicate.. . . .	1,308
Requisitions for patents prepared in duplicate.. . . .	1,014

MANITOBA SCHOOL LANDS.

STATEMENT of Revenue Collected from School Lands for Fiscal Year from April 1, 1919, to March 31, 1920, both dates inclusive.

	Principal.	Interest.	Total.	Cultiva- tion.	Grazing. rent.	Timber.	Hay.	Petroleum and Nat. gas.	Registra- tion fees.	Miscell- aneous.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Total	383,036 60	269,566 07	652,602 67	385 30	8,077 33	2,001 78	3,095 95	925 00		3 00	667,091 03
Registration fees transferred from Dominion lands.											
Total	383,036 60	269,566 07	652,602 67	385 30	8,077 33	2,001 78	3,095 95	925 00	354 00	3 00	667,445 03
Office fees transferred to Do- minion lands.						20 25	551 50				571 75
Total	383,036 60	269,566 07	652,602 67	385 30	8,077 33	1,981 53	2,544 45	925 00	354 00	3 00	666,873 28
Refunds.	2,507 40	242 32	2,749 72	7 50	898 27	34 50	143 45				3,833 44
Total	380,529 20	269,323 75	649,852 95	377 80	7,179 06	1,947 03	2,401 00	925 00	354 00	3 00	663,039 84

SASKATCHEWAN SCHOOL LANDS.

STATEMENT of Revenue collected from School Lands for Fiscal Year from April 1, 1919, to March 31, 1920, both dates inclusive.

	Principal.	Interest.	Total.	Cultiva- tion.	Grazing rent.	Timber.	Hay.	Coal.	Petroleum and Nat. gas.	Registra- tion fees.	Miscell- aneous.	Total.
Total.	1,322,162 13	761,742 57	2,083,904 70	463 50	106,460 78	1,417 65	5,513 57	2,003 01	2,401 73	6 50	962 91	2,203,134 38
Registration fees transferred from Dominion lands.										860 00		860 00
Total.	1,322,162 13	761,742 57	2,083,904 70	463 50	106,460 78	1,417 65	5,513 57	2,003 01	2,401 73	866 50	962 91	2,203,994 38
Office fees transfer- red to Dominion Lands.						14 25	1,232 50					1,246 75
Total.	1,322,162 13	761,742 57	2,083,904 70	463 50	106,460 78	1,403 40	4,281 07	2,003 01	2,401 73	866 50	962 91	2,202,747 03
Refund.	5,160 69	1,620 46	6,781 15	39 00	4,953 56		261 65	35 00		2 00	2 00	12,074 46
Total	1,317,001 44	760,122 11	2,077,123 55	424 50	101,507 22	1,403 40	4,019 42	1,968 01	2,401 73	864 50	960 81	2,190,673 17

ALBERTA SCHOOL LANDS.

STATEMENT of Revenue collected from School Lands for Fiscal Year from April 1, 1919, to March 31, 1920, both dates inclusive.

	Principal.	Interest.	Total.	Cultiva- tion.	Grazing rent.	Timber.	Hay.	Coal.	Petroleum and Nat. gas.	Registra- tion fees.	Miscell- aneous.	Total.
Total.....	578,309 18	292,261 37	870,570 55	39 35	98,356 50	4,063 74	5,849 93	27,768 33	23,864 64	18 00	52 00	1,030,583 04
Registration fees transferred from Dominion lands.....										637 00		637 00
Total.....	578,309 18	292,261 37	870,570 55	39 35	98,356 50	4,063 74	5,849 93	27,768 33	23,864 64	655 00	52 00	1,031,220 04
Office fees transferred to Dominion Lands.....						12 00	737 20					749 20
Total.....	578,309 18	292,261 37	870,570 55	39 35	98,356 50	4,051 74	5,112 73	27,768 33	23,864 64	655 00	52 00	1,030,470 84
Refunds.....	5,178 07	781 44	5,959 51		4,997 67		741 86	38 00	903 00			12,640 04
Total.....	573,131 11	291,479 93	864,611 04	39 35	93,358 83	4,051 74	4,370 87	27,730 33	22,961 64	655 00	52 00	1,017,830 80

Certified correct,

(Signed) GEO. D. POPE,
Controller of Revenue.

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MANITOBA SCHOOL LANDS.

STATEMENT of Revenue and Expenditure on account of Manitoba School Lands for the Fiscal Year ended March 31, 1920.

Particulars.	Period.	Dr.	Cr.
		\$ cts.	\$ cts.
By balance on April 1, 1920.....			443,945 09
" sales.....	12 months ended March 31, 1920.		649,852 95
" cultivation permits.....	" "		377 80
" timber dues, hay permits, grazing rental and miscellaneous.....	" "		12,455 09
" registration fees.....	" "		354 00
" interest on fund.....	" "		11,058 06
To cost of management at Ottawa.....	" "	7,165 02	
" salaries, printing, advertising and general expenses.....	" "	7,594 62	
" revenue and interest paid to Manitoba Government.....	" "	267,751 00	
" interest on fund paid to Manitoba Government.....	" "	11,058 06	
" investments in 5 per cent debenture bonds.....	" "	823,700 00	
" balance March 31, 1920.....		774 29	
		1,118,042 99	1,118,042 99

NOTE.—Balance at credit of Manitoba School Lands Fund March 31, 1920, was \$5,181,774.29, of which \$5,181,000 is invested in Dominion of Canada debenture stock maturing October 1, 1922 at 5 per cent per annum, as per Order in Council of December 1, 1919. Interest paid on investments for fiscal year 1919-20 totalled \$233,982.50.

SASKATCHEWAN SCHOOL LANDS.

STATEMENT of Revenue and Expenditure on account of Saskatchewan School Lands for the Fiscal Year ended March 31, 1920.

Particulars.	Period.	Dr.	Cr.
		\$ cts.	\$ cts.
By balance on April 1, 1919.....			1,107,536 89
" sales.....	12 months ended March 31, 1920.		2,077,123 55
" cultivation permits.....	" "		424 50
" timber dues, hay permits, grazing, rental, coal, petroleum and miscellaneous.....	" "		112,260 62
" registration fees.....	" "		864.50
" interest on fund.....	" "		27,300 38
To cost of management at Ottawa.....	" "	21,495 08	
" salaries, printing, advertising and general expenses.....	" "	16,980 61	
" revenue and interest paid to Saskatchewan Government.....	" "	835,196 04	
" interest on fund paid to Saskatchewan Government.....	" "	27,300 38	
" investments in 5 per cent debenture bonds.....	" "	2,423,700 00	
" balance March 31, 1920.....		838 33	
		3,325,510 44	3,325,510 44

NOTE.—Balance at credit of Saskatchewan School Lands Fund March 31, 1920, was \$8,830,838.33, of which \$8,830,000 is invested in Dominion of Canada debenture stock maturing October 1, 1922, at 5 per cent per annum, as per Order in Council of December 1, 1919. Interest paid on investments for fiscal year 1919-20 totalled \$364,795.

ALBERTA SCHOOL LANDS.

STATEMENT of Revenue and Expenditure on account of Alberta School Lands for the the Fiscal Year ended March 31, 1920.

Particulars.	Period.	Dr.	Cr.
		\$ cts.	\$ cts.
By balance on April 1, 1920.....			587,658 43
“ sales.....	12 months ended March 31, 1920.		864,611 04
“ cultivation permits.....	“ “		39 35
“ timber dues, hay permits, grazing rental, coal, petroleum and miscellaneous.....	“ “		152,525 41
“ registration fees.....	“ “		655 00
“ interest on fund.....	“ “		14,174 75
To cost of management at Ottawa.....	“ “	14,330 05	
“ salaries, printing, advertising and general expenses.....	“ “	11,915 66	
“ revenue and interest paid to Alberta Government.....	“ “	418,453 98	
“ interest on fund paid to Alberta Government.....	“ “	14,174 75	
“ investments in 5 per cent debenture bonds.....	“ “	1,160,600 00	
“ balance March 31, 1920.....		189 54	
		1,619,663 98	1,619,663 98

NOTE.—Balance at credit of Alberta School Lands Fund March 31, 1920, was \$5,331,189.54, of which \$5,331,000 is invested in Dominion of Canada debenture stock maturing October 1, 1922, at 5 per cent pe annum, as per Order in Council of December 1, 1919. Interest paid on investments for fiscal year 1919-20 totalled \$230,385.

LAND PATENTS BRANCH.

Report of Mr. W. S. Gliddon, Acting Controller of the Land Patents Branch and Deputy Registrar of Dominion Lands Patents, for the fiscal year ended March 31, 1920, with statements in relation thereto, marked A to K, inclusive.

LETTERS PATENT.

During the year 17,732 letters patent were issued, covering an area of 2,785,830 acres, which may be classified by provinces as follows:—

Province.	Patents.	Area.
Manitoba.. . . .	2,030	317,030
Saskatchewan.. . . .	9,701	1,541,729
Alberta.. . . .	5,745	903,085
British Columbia.. . . .	238	23,295
Yukon Territory.. . . .	13	475
Northwest Territories.. . . .	5	216
	17,732	2,785,830

The details of these letters patent are given in the statements appended hereto marked A to G, inclusive, and may be summarized as follows:—

Grants.	Patents.	Acres.
Homesteads.. . . .	10,355	1,638,098
Sales.. . . .	1,658	261,851
Pre-emptions.. . . .	4,883	775,963
Purchased homesteads	518	80,312
Railways.. . . .	175	18,435
Special or free grants.....	80	7,541
Northwest half-breeds.....	3	320
Licenses of occupation	15	918
Quit claims.. . . .	41	—
Hudson's Bay Company.. . . .	4	2,392
	17,732	2,785,830

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These statements show an increase of 922 letters patent and a decrease in the area of 277,553 acres, as compared with the preceding year.

Since May, 1873, there have been issued 415,268 letters patent, aggregating an area of 94,829,925 acres. Those issued since July, 1883, are of record in the Land Patents Branch, and number about 400,000.

LANDS DISPOSED OF.

Six thousand seven hundred and thirty-two homestead entries were granted during the year, aggregating an approximate area of 1,077,120 acres, made up by provinces as follows:—

Province.	Homestead entries.	Acres.
Manitoba..	1,232	
Saskatchewan	1,918	
Alberta..	3,448	
British Columbia..	134	
	<hr/> 6,732	<hr/> 1,077,120

There was an increase of 2,505 in the number of homestead entries granted, as compared with the previous year.

By land agencies the 6,732 homestead entries are made up as follows:—

Manitoba—	Entries.
Dauphin..	723
Le Pas..	—
Winnipeg..	509
	<hr/> 1,232
Saskatchewan—	
Battleford..	351
Moosejaw..	228
Prince Albert..	922
Saskatoon..	204
Swift Current..	213
	<hr/> 1,918
Alberta—	
Calgary..	309
Edmonton..	1,416
Grande Prairie..	824
Lethbridge..	120
Peace River..	779
	<hr/> 3,448
British Columbia—	
Kamloops..	82
New Westminster..	44
Revelstoke..	8
	<hr/> 134

The 6,732 entrants for homesteads represented 13,945 persons, as compiled from the information obtained from each entrant. Of these entries 2,143 were made by residents of the several provinces of the Dominion; 13 by Canadians who had returned from the United States; 875 by persons who had previously obtained homestead entries, but which had been cancelled by default or at the request of the entrants in order, in most cases, to enter for other lands; 1,766 by persons from the British Isles; 1,318 by Americans; 69 by naturalized Austro-Hungarians; 137 by Russians and Finns; 92 by Norwegians; 82 by Swedes; 5 by naturalized Germans; 58 by Frenchmen; 26 by Belgians, and the remaining 148 by citizens of various other countries.

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There were 5,981 soldier grant entries made during the year, aggregating approximately an area of 956,960 acres, made up by provinces as follows:—

Province.	No. of entries.	Acres.
Manitoba..	1,129	180,640
Saskatchewan..	1,996	319,360
Alberta..	2,739	438,240
British Columbia..	117	18,720
	<u>5,981</u>	<u>956,960</u>

By land agencies as follows:—

	No. of entries.	
Manitoba—		
Dauphin..	467	
Winnipeg..	662	
	<u>1,129</u>	1,129
Saskatchewan—		
Battleford..	168	
Moosejaw..	241	
Prince Albert..	1,122	
Saskatoon..	272	
Swift Current..	193	
	<u>1,996</u>	1,996
Alberta—		
Calgary..	333	
Edmonton..	1,179	
Grande Prairie..	590	
Lethbridge..	114	
Peace River..	523	
	<u>2,739</u>	2,739
British Columbia—		
Kamloops..	72	
New Westminster..	35	
Revelstoke..	10	
	<u>117</u>	117
		<u>5,981</u>

CANCELLED ENTRIES.

There were cancelled during the same period 8,728 entries, made up as follows:—

	Manitoba.	Saskatchewan.	Alberta.	British Columbia.
Homesteads..	1,663	2,389	3,673	166
Pre-emptions	3	521	297	—
Purchased homesteads .. . . . .	.....	4	11	—
Sales.....	.....	.....	1	—
Total	<u>1,666</u>	<u>2,914</u>	<u>3,982</u>	<u>166</u>

SALES.

Four hundred and nineteen sales were made during the fiscal year for 16,132 acres, with an average for each sale of about 38½ acres.

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NEWLY SURVEYED LANDS THROWN OPEN TO HOMESTEAD ENTRY.

During the past fiscal year newly surveyed lands comprised in two hundred and fifty-five townships were made available for homestead entry in the following land agencies:—

Dauphin, Man..	in 18 townships.
Winnipeg, Man..	" 39 "
Battleford, Sask..	" 2 "
Prince Albert, Sask..	" 43 "
Saskatoon, Sask..	" 1 "
Swift Current, Sask..	" 2 "
Edmonton, Alta..	" 31 "
Grande Prairie, Alta..	" 23 "
Lethbridge, Alta..	" 2 "
Peace River, Alta..	" 76 "
Kamloops, B.C..	" 9 "
New Westminster, B.C..	" 6 "
Revelstoke, B.C..	" 3 "

ACCOUNTS AND REVENUE.

The accounts in connection with purchased homesteads, pre-emptions and ordinary sales are kept in this branch and at the present time these number about 33,200 individual accounts.

During the fiscal year \$2,719,063.72, including \$413,856.60 interest on deferred payments, was received on account of purchased homesteads, pre-emptions and ordinary sales, being an increase of \$545,573.65 as compared with the payments received during the previous year.

\$157,375.78 has also been received for entry fees, improvements and sundries, making a total revenue for the fiscal year of \$2,876,439.50.

Refunds to the number of 1,372 and covering \$48,625.04 were made as follows:—

On account of improvements on cancelled homesteads, 495 refunds	\$32,836 45
Overpayments on sales and moneys paid on cancelled purchased homestead entries and pre-emption sales, 877 refunds.. . . .	15,788 59
	<hr/>
	\$48,625 04

“ A.”

STATEMENT OF LETTERS PATENT covering Dominion Lands situate in Manitoba, Saskatchewan, Alberta, Northwest Territories, British Columbia and the Yukon Territory issued from the Department of the Interior during the fiscal year ending March 31, 1920, as compared with the fiscal year ending March 31, 1919, and recorded in the Land Patents Branch.

No.	Nature of Grant.	From April 1, 1919, to March 31, 1920.		From April 1, 1918. to March 31, 1919.	
		Patents.	Acres.	Patents.	Acres.
1	Alberta Railway and Irrigation Co's sales.....	3	904	34	61,267
2	British Columbia homesteads.....	128	14,908	149	19,015
3	British Columbia sales.....	18	481	15	2,140
4	Commutation grants.....	2	134		
5	Coal lands sales.....	3	1,652		
6	Coal surface sales.....	2	11	4	772
7	Greater Winnipeg Water district.....			3	129
8	Homesteads, Peace River block.....	50	7,407	89	14,230
9	Homesteads.....	10,175	1,615,463	9,065	1,445,425
10	Hudson's Bay Co.....	4	2,392	6	1,017
11	Leases.....			2	786
12	License of occupation.....	15	918	11	79
13	Military bounty grants.....			1	141
14	Military homesteads.....			1	320
15	Mining lands sales.....	13	563	7	405
16	Mineral rights (1,108 acres).....	4		3	
17	Northwest half-breed grants.....	3	320	4	501
18	Parish sales.....	3	572	1	
19	Pre-emption sales.....	4,883	775,963	4,214	668,333
20	Purchased homesteads.....	518	80,312	595	91,881
21	Quit claim, sales (1,393 acres).....	20			
22	Quit claim, special grants (1,674 acres).....	21		23	
	Railways:				
23	Alberta and Great Waterways Railway Co.....	21	253	24	317
24	Calgary and Edmonton Railway Co.....	1	155	213	226,645
25	Canadian Northern Alberta Railway Co.....	1	2	78	531
26	Canadian Northern Railway Co.....	51	16,350	60	28,159
27	Canadian Northern Manitoba Railway Co.....			4	73
28	Canadian Northwestern Railway Co.....			26	319
29	Canadian Pacific Railway grants.....	5	19	23	923
30	Canadian Pacific Railway roadbed and station grounds.....	30	262	16	71
31	Central Canada Railway Co.....	5	208	19	235
32	Edmonton, Dunvegan and British Columbia Railway Co.....	9	71	81	1,099
33	Grand Trunk Pacific Railway.....	1	9	3	27
34	Grand Trunk Pacific Branch Lines Co.....	23	246	3	43
35	Manitoba and Northwestern Railway Co.....			1	153
36	Nicola, Kamloops and Similkameen Railway Co....	23	143		
37	Qu'Appelle, Long Lake and Saskatchewan Railroad and Steamboat Co.....	5	717	418	255,699
38	Sales.....	497	33,432	390	23,490
39	Sales, Peace River block.....	1	15	2	190
40	School lands sales.....	1,103	224,066	1,110	212,985
41	Soldier grants.....	20	3,137		
42	Special grants.....	58	4,270	92	4,840
43	Yukon Territory homesteads.....	2	320	5	720
44	Yukon Territory sales.....	11	155	15	423
	Totals.....	17,732	2,785,830	16,810	3,063,383

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"B."

STATEMENT OF LETTERS PATENT covering Dominion Lands situate in the Province of Manitoba, issued from the Department of the Interior during the fiscal year ending March 31, 1920, as compared with the fiscal year ending March 31, 1919, and recorded in the Land Patents Branch.

No.	Nature of Grant.	From April 1, 1919, to March 31, 1920.		From April 1, 1918, to March 31, 1919.	
		Patents.	Acres.	Patents.	Acres.
1	Greater Winnipeg Water District.....			3	129
2	Commutation grants.....	2	134		
3	Homesteads.....	1,683	264,103	1,072	1,677,701
4	Hudson's Bay Co.....	1	6		
5	Mining lands sales.....	13	563	6	276
6	Northwest half-breed grants.....			2	240
7	Parish sales.....	3	572	1	
8	Pre-emption sales.....	2	354	4	640
9	Quit claim, sales (470 acres).....	6			
10	Quit claim, special grants.....	1		4	
	Railways:				
11	Canadian Northern Railway Co.....	5	335	19	232
12	Canadian Northern Manitoba Railway Co.....			4	73
13	Canadian Pacific Railway grants.....			1	6
14	Canadian Pacific Railway roadbed and station grounds.....	18	158	8	6
15	Sales.....	51	2,170	36	1,956
16	School lands sales.....	236	48,234	314	62,133
17	Special grants.....	9	401	4	360
	Totals.....	2,030	317,030	1,478	233,752

“ C.”

STATEMENT OF LETTERS PATENTS covering Dominion Lands situate in the Province of Saskatchewan, issued from the Department of the Interior during the fiscal year ending March 31, 1920, as compared with the fiscal year ending March 31, 1919, and recorded in the Land Patents Branch.

No.	Nature of Grant.	From April 1, 1919, to March 31, 1920.		From April 1, 1918, to March 31, 1919.	
		Patents.	Acres.	Patents.	Acres.
1	Homesteads.....	4,714	740,803	4,554	729,282
2	Hudson's Bay Co	2	1,732	2	389
3	License of occupation	3	10	8	71
4	Military homesteads			1	320
5	Mineral rights.....			1	
6	Northwest half-breed grants.....	3	320	1	160
7	Pre-emption sales.....	3,677	584,557	2,849	452,314
8	Purchased homesteads.....	365	56,756	418	64,823
9	Quit claim, sales (774 acres).....	13			
10	Quit claim, special grants (1,593 acres).....	16		10	
	Railways:				
11	Calgary and Edmonton Railway Co.....			6	9,444
12	Canadian Northern Railway Co.....	46	16,015	38	27,901
13	Canadian Pacific Railway grants.....	2	18	1	2
14	Canadian Pacific Railway roadbed and station grounds.....			1	3
15	Grand Trunk Pacific Railway Co.....	1	9		
16	Grand Trunk Pacific Branch Lines Co.....	1	6		
17	Manitoba and Northwestern Railway Co.....			1	153
18	Qu'Appelle, Long Lake and Saskatchewan Railroad and Steamboat Co.....	5	717	418	255,699
19	Sales.....	242	21,541	157	11,761
20	School lands sales.....	571	114,306	362	61,612
21	Soldier grants.....	16	2,496		
22	Special grants.....	24	2,443	27	2,079
	Totals.	9,701	1,541,729	8,855	1,616,013

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"D."

STATEMENT OF LETTERS PATENT covering Dominion Lands situate in the Province of Alberta, issued from the Department of the Interior during the Fiscal Year ending March 31, 1920, as compared with the Fiscal Year ending March 31, 1919, and recorded in the Land Patents Branch.

No.	Nature of Grant.	From April 1, 1919, to March 31, 1920.		From April 1, 1918, to March 31, 1919.	
		Patents.	Acres.	Patents.	Acres.
1	Alberta Railway and Irrigation Co's. sales.....	3	904	34	61,267
2	Coal lands sales.....	3	1,652		
3	Coal surface sales.....	2	11	4	772
4	Homesteads.....	3,778	610,557	3,439	548,442
5	Hudson's Bay Co.....	1	654	3	622
6	Leases.....			1	765
7	License of occupation.....	12	908	3	8
8	Military bounty grants.....			1	141
9	Mining lands sales.....			1	129
10	Mineral rights (1,108 acres).....	4		2	
11	Northwest half-breed grants.....			1	101
12	Pre-emption sales.....	1,204	191,052	1,361	215,379
13	Purchased homesteads.....	150	23,495	175	27,040
14	Quit claim, sales (149 acres).....	1			
15	Quit claim, special grants (72 acres).....	3		9	
	Railways—				
	Alberta and Great Waterways Railway Co.....	21	253	24	317
17	Calgary and Edmonton Railway Co.....	1	155	207	217,201
18	Canadian Northern Railway Co.....			3	26
19	Canadian Northern Alberta Railway Co.....	1	2	78	531
20	Canadian Northwestern Railway Co.....			26	319
21	Canadian Pacific Railway grants.....	3	1	20	900
	Canadian Pacific Railway boardbed and station grounds.....	1	7	1	8
23	Central Canada Railway Co.....	5	208	19	235
24	Edmonton Dunvegan and British Columbia Railway Co.....	9	71	81	1,099
25	Grand Trunk Pacific Railway Co.....			3	27
26	Grand Trunk Pacific Branch Lines Co.....	22	240	3	43
27	Sales.....	200	9,658	194	9,747
28	School lands sales.....	296	61,526	434	89,204
29	Soldier grants.....	4	641		
30	Special grants.....	21	1,090	60	2,391
	Totals.....	5,745	903,085	6,187	1,176,750

“ E.”

STATEMENT OF LETTERS PATENT covering Dominion Lands situate in the Province of British Columbia issued from the Department of the Interior during the Fiscal Year ending March 31, 1920, as compared with the Fiscal Year ending March 31, 1919, and recorded in the Land Patents Branch.

No.	Nature of Grant.	From April 1, 1919, to March 31, 1920.		From April 1, 1918, to March 31, 1919.	
		Patents.	Acres.	Patents.	Acres.
1	British Columbia homesteads.....	128	14,908	149	19,015
2	British Columbia sales.....	18	481	15	2,140
3	Homesteads, Peace River Block.....	50	7,407	89	14,230
4	Leases.....			1	21
5	Purchased homesteads.....	3	61	2	18
6	Quit claim, special grants (9 acres).....	1			
	Railways:—				
	Canadian Pacific Railway grants.....			1	15
	Canadian Pacific Railway roadbed and station grounds.....	11	97	6	54
	Nicola Kamloops and Similkameen Railway Co.....	23	143		
10	Sales, Peace River Block.....	1	15	2	190
11	Special grants.....	3	183	1	10
	Totals.....	238	23,295	266	35,693

“ F.”

STATEMENT OF LETTERS PATENT covering Dominion Lands situate in the Yukon Territory, issued from the Department of the Interior during the Fiscal Year ending March 31, 1920, as compared with the Fiscal Year ending March 31, 1919, and recorded in the Land Patents Branch.

No.	Nature of Grant.	From April 1, 1919, to March 31, 1920.		From April 1, 1918, to March 31, 1919.	
		Patents.	Acres.	Patents.	Acres.
1	Yukon Territory homesteads.....	2	320	5	720
2	Yukon Territory sales.....	11	155	15	423
	Totals.....	13	475	20	1,143

“ G.”

STATEMENT OF LETTERS PATENT covering Dominion Lands situate in the Northwest Territories issued from the Department of the Interior during the Fiscal Year ending March 31, 1920, as compared with the Fiscal Year ending March 31, 1919, and recorded in the Land Patents Branch.

No.	Nature of Grant.	From April 1, 1919, to March 31, 1920.		From April 1, 1918, to March 31, 1919.	
		Patents.	Acres.	Patents.	Acres.
1	Hudson's Bay Co.....			1	6
2	Sales.....	4	63	3	26
3	Special grants.....	1	153		
	Totals.....	5	216	4	32

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"H."

STATEMENT showing the number of Homestead Entries made during the Year ending March 31, 1920, the Nationality of the Homesteaders and the Provinces in which the entries were made.

Nationalities.	Provinces.				Total.
	Manitoba.	Saskatchewan.	Alberta.	British Columbia	
Canadians from Ontario.....	176	322	426	13	937
do do Quebec.....	38	101	158	1	298
do do Nova Scotia.....	16	22	66	2	106
do do New Brunswick.....	4	14	61	4	83
do do Prince Edward Island.....	2	10	34	1	47
do do Manitoba.....	213	75	73	4	365
do do Saskatchewan.....	16	69	41		126
do do Alberta.....	5	22	104	13	144
do do British Columbia.....		5	32		37
Persons who had previous entry.....	120	248	495	12	875
Newfoundlanders.....		2	8		10
Canadians returned from the United States.....		5	8		13
Americans.....	90	345	866	17	1,318
English.....	300	377	540	35	1,252
Scotch.....	78	92	173	17	360
Irish.....	34	45	69	6	154
French.....	15	16	27		58
Belgians.....	9	9	8		26
Swiss.....	2	5	6		13
Italians.....	3	2	6	1	12
Roumanians.....	1	5	4		10
Syrians.....	1	1	2		4
Germans.....		3	2		5
Austro-Hungarians.....	27	26	15	1	69
Hollanders.....	6	1	6		13
Danes (other than Icelanders).....	4	6	25		35
Icelanders.....	14	2	4		20
Swedes.....	8	21	51	2	82
Norwegians.....	12	28	51	1	92
Russians (other than Finns).....	15	29	61		105
Finns.....	15	4	13		32
Servians.....			3	1	4
Bulgarians.....					
Chinese.....				1	1
Japanese.....					
Persians.....					
Australians.....	1	2	2		5
New Zealanders.....	1				1
Hindoos.....					
Greeks.....	1				1
Poles.....	4	4	5		13
Bohemians.....	1		2	1	4
Armenians.....			1	1	2
Total.....	1,232	1,918	3,448	134	6,732

Number of souls represented by above entries, 13,945.

“I.”

STATEMENT showing the number of Homestead Entries made in the Province of Manitoba, Saskatchewan, Alberta and British Columbia during the Year ending March 31, 1920, by persons coming from the United States of America.

States.	Provinces.				Total.
	Manitoba	Saskat- chewan.	Alberta.	British Columb	
Alabama	1		1		2
Alaska.....					
Arizona.....		1	1		2
Arkansas		2	4		6
California.....		1	9		10
Carolina, North.....	1	3	3		7
Carolina, South.....					
Colorado.....			9	1	10
Columbia, District of.....					
Connecticut.....		2			2
Dakota, North.....	18	46	61	4	129
Dakota, South.....	2	12	17		31
Delaware.....					
Florida.....					
Georgia.....			1		1
Idaho.....		1	24		25
Illinois.....	6	11	39	1	57
Indiana.....	2	12	15		29
Indian Territory.....				1	1
Iowa.....	7	31	57	4	99
Kansas.....		12	30	1	43
Kentucky.....	1	2	15		18
Louisiana.....			1		1
Maine.....		3	18	1	22
Maryland.....	1		2		3
Massachusetts.....	2	10	28	1	41
Michigan.....	7	32	65		104
Minnesota.....	18	70	109		197
Mississippi.....		1			1
Missouri.....	1	8	20		29
Montana.....	3	7	38		48
Nebraska.....	1	7	28		36
Nevada.....			2		2
New Hampshire.....		4	4		8
New Jersey.....			4		4
New Mexico.....			1		1
New York.....	2	14	33		49
Ohio.....	5	4	28	2	39
Oklahoma.....	1	5	13		19
Oregon.....		3	29		32
Pennsylvania.....	7	7	24		38
Rhode Island.....		1	4		5
Tennessee.....			4		4
Texas.....		6	14		20
Utah.....			6		6
Vermont.....			4		4
Virginia.....			7		7
Virginia, West.....		2	4		6
Washington.....		5	31		36
Wisconsin.....	4	22	65	1	92
Wyoming.....		3	2		5
Total.....	90	350	874	17	1,331

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"J."

STATEMENT showing the number of Homestead Entries made during the Fiscal Year ending March 31, 1920, as compared with Fiscal Year ending March 31, 1919.

Agency.	Manitoba.		Saskatchewan.		Alberta.		British Columbia.		Total.
	1918-19.	1919-20	1918-19.	1919-20	1918-19.	1919-20	1918-19.	1919-20.	
Battleford.....			142	351					
Calgary.....					220	309			
Dauphin.....	424	723							
Edmonton.....					844	1,416			
Grande Prairie.....					558	824			
Kamloops.....							31	82	
Le Pas.....	1	0							
Lethbridge.....					103	120			
Moosejaw.....			206	228					
New Westminster.....							13	44	
Peace River.....					384	779			
Prince Albert.....			535	922					
Revelstoke.....							10	8	
Saskatoon.....			122	204					
Swift Current.....			186	213					
Winnipeg.....	388	509							
Fiscal year 1919-20.....									6,732
" 1918-19.....									4,227
Net increase.....									
Total	813	1,232	1,191	1,918	2,169	3,448	54	34	2,505

RECAPITULATION.

Month.	Manitoba.		Saskatchewan.		Alberta.		British Columbia.		Total.
	1919-20.	1918-19.	1919-20.	1918-19.	1919-20.	1918-19.	1919-20.	1918-19.	
1920.									
January.....	35	39	92	72	102	97	12	1	241
February.....	57	49	88	63	97	96	10	0	252
March.....	81	62	104	71	126	154	11	2	322
1919.									
April.....	116	98	198	132	365	261	7	5	686
May.....	99	63	227	112	395	281	14	11	735
June.....	175	97	186	130	459	273	12	9	832
July.....	186	121	249	172	488	290	13	9	936
August.....	92	85	177	121	492	205	7	3	768
September.....	116	39	175	78	328	168	13	2	632
October.....	131	67	181	98	290	156	12	2	614
November.....	74	57	114	74	159	103	9	4	356
December.....	70	36	127	68	147	91	14	0	358
Total.....	1,232	813	1,918	1,191	3,448	2,169	134	54	6,732

“ K.”

STATEMENT showing the number of Soldier Grant Entries made during the Fiscal Year to March 31, 1920.

Agency.	Manitoba.		Saskatchewan.		Alberta.		British Columbia.		Total.
	191...	1919-20.	191...	1919-20.	191...	1919-20.	191...	1919-20.	
Battleford.....				168					
Calgary.....						333			
Dauphin.....		467							
Edmonton.....						1,179			
Grande Prairie.....						590			
Kamloops.....								72	
Lethbridge.....						114			
Moosejaw.....				241					
New Westminster.....								35	
Peace River.....						523			
Prince Albert.....				1,122					
Revelstoke.....								10	
Saskatoon.....				272					
Swift Current.....				193					
Winnipeg.....		662							
Total.....									5,981

REPORT OF THE ACTING SUPERINTENDING ACCOUNTANT, G. D. POPE.

Statements of revenue collected from various sources during the fiscal year ended March 31, 1920, as follows:—

A—Dominion lands, including Yukon.. . . .	\$4,738,840 85
B—Ordnance lands.. . . .	9,840 33
C—School lands.. . . .	3,900,091 75
D—Registration fees, Yukon.. . . .	430 78
E—Fines and forfeitures.. . . .	70 00
F—Casual revenue.. . . .	22,837 87
G—Seed grain and relief repayments.. . . .	1,155,354 64
H—Sales of land, special account.. . . .	75,255 00
	<u>\$9,902,721 22</u>

A statement of revenue on account of Dominion Lands (marked I) shows the receipts classified under subheads.
Statement (marked J) shows a comparison between the receipts on account of revenue for the previous twelve months.

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DOMINION LANDS REVENUE (Cash and Scrip) for the Fiscal Year ended March 31, 1920.

Agencies.	Cash.	Scrip.	Total.
<i>Yukon Territory—</i>			
Sales of land..	\$ 3,555 26	.....	\$ 3,555 26
Rentals of land..	5,946 50	.....	5,946 50
Map sales, office fees, etc .. .	6 00	.....	6 00
Timber dues..	5,653 06	.....	5,653 06
Hay permits..	53 60	.....	53 60
Mining fees..	37,619 18	.....	37,619 18
Export tax on gold..	41,463 84	.....	41,463 84
Free certificates for export of gold	8 00	.....	8 00
Hydraulic leases..	2,265 00	.....	2,265 00
Dredging leases..	868 19	.....	868 19
Homestead fees..	30 00	.....	30 00
	<hr/> \$97,468 63	<hr/>	<hr/> \$97,458 63
<i>Dominion Lands Agencies—</i>			
Battleford..	\$100,683 99	.....	\$100,683 99
Calgary..	535,370 20	.....	535,370 20
Dauphin..	13,700 15	.....	13,700 15
Edmonton..	46,488 25	.....	46,488 25
Grande Prairie..	13,565 53	.....	13,565 53
Kamloops..	10,323 28	.....	10,323 28
Lethbridge..	157,462 39	.....	157,462 39
Moosejaw..	807,785 39	.....	807,785 39
New Westminster..	5,263 93	.....	5,263 93
Peace River..	12,735 45	.....	12,735 45
Prince Albert..	21,440 69	.....	21,440 69
Revelstoke..	3,461 53	.....	3,461 53
Saskatoon..	335,165 88	.....	335,165 88
Swift Current..	791,196 44	80 00	791,276 44
Winnipeg..	39,879 64	.....	39,879 64
	<hr/> \$2,894,522 74	<hr/> \$80 00	<hr/> \$2,894,602 74
<i>Crown Timber Agencies—</i>			
Battleford..	\$ 1,620 81	.....	\$ 1,620 81
Calgary..	38,223 84	.....	38,223 84
Dauphin..	30,979 11	.....	30,979 11
Edmonton..	112,266 08	.....	112,266 08
Grande Prairie..	1,429 52	.....	1,429 52
Kamloops..	34,398 24	.....	34,398 24
Lethbridge..	3,208 45	.....	3,208 45
Moosejaw..	653 30	.....	653 30
New Westminster	130,873 33	.....	130,873 33
Peace River..	1,251 54	.....	1,251 54
Prince Albert..	105,127 09	.....	105,127 09
Revelstoke..	29,875 49	.....	29,875 49
Saskatoon..	1,668 63	.....	1,668 63
Swift Current	476 55	476 55
Winnipeg..	92,075 17	92,075 17
	<hr/> \$584,127 15	<hr/>	<hr/> \$584,127 15

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DOMINION LANDS REVENUE (Cash and Scrip) for the Fiscal Year ended March 31, 1920.

Agencies.	Cash.	Scrip.	Total.
Miscellaneous—			
Rocky Mountain park.. . . .	\$ 48,330 58	.....	\$ 48,330 58
Jasper park.. . . .	21,227 93	.....	21,227 93
Yoho park.. . . .	828 45	.....	828 45
Waterton Lakes park.. . . .	3,848 42	.....	3,848 42
Elk Island park.. . . .	16 00	.....	16 00
Buffalo park.. . . .	1,949 55	.....	1,949 55
Glacier park.. . . .	18 50	.....	18 50
Fort Anne park.. . . .	47 00	.....	47 00
Antelope park.. . . .	409 60	.....	409 60
Moose Mountain Buffalo park ..	35 60	.....	35 60
Point Pelee park.. . . .	30 44	.....	30 44
Survey fees.. . . .	18 68	.....	18 68
Irrigation fees.. . . .	540 50	.....	540 50
Map sales, office fees, etc.. . .	13,175 02	.....	13,175 02
Fees Board of Examiners, D.L.S.	255 00	.....	255 00
Mining fees.. . . .	24,635 90	.....	24,635 90
Grazing lands.. . . .	183,661 96	.....	183,661 96
Grazing lands (improvements)..	1,105 80	.....	1,105 80
Hay permits.... . . .	36,308 59	.....	36,308 59
Coal lands.. . . .	361,947 48	.....	361,947 48
Dredging leases.. . . .	1,090 78	.....	1,090 78
Stone quarries.. . . .	8,717 12	.....	8,717 12
Rent of water-power.. . . .	3,661 18	.....	3,661 18
Suspense account.. . . .	6,725 88	.....	6,725 88
Petroleum.. . . .	370,482 67	.....	370,482 67
Sand, stone and gravel.. . . .	541 45	.....	541 45
Forestry Branch sale of trees, etc.	4 012 55	.....	4,012 55
Fishing permits.. . . .	881 00	.....	881 00
General sales.. . . .	2,099 34	.....	2,099 34
Rentals.. . . .	8,749 82	.....	8,749 82
Miscellaneous.. . . .	5,756 16	.....	5,756 16
Irrigation sales.. . . .	50,297 01	.....	50,297 01
Potash leases.. . . .	1,316 37	.....	1,316 37
	\$1,162,722 33	.....	\$1,162,722 33
Total revenue.. . . .	\$4,738,840 85	\$80 00	\$4,738,920 85
Less refunds.. . . .	116,249 03	.....	116,249 03
	\$4,622,591 82	\$80 00	\$4,622,671 82

STATEMENT of Ordnance Lands Revenue for the Fiscal Year ended March 31, 1920.

Fiscal Year.	Gross revenue.	Refunds.	Net revenue.
	\$ cts.	\$ cts.	\$ cts.
1919-20.....	9,840 33	5 69	9,834 64

STATEMENT of Receipt on Account of School Lands for the Fiscal Year ended March 31, 1920.

Manitoba School lands.. . . .	\$ 666,873 28
Saskatchewan School lands.. . . .	2,202,747 63
Alberta School lands.. . . .	1,030,470 84
Total.. . . .	\$3,900,091 75

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STATEMENT of Registration Fees in the Yukon Territory for the Fiscal Year ended March 31, 1920.

Fiscal Year.	Gross revenue.	Land assurance fund.	Net revenue.
	\$ cts.	\$ cts.	\$ cts.
1919-20.....	430 78	7 03	423 75

STATEMENT of Fines and Forfeitures for the Fiscal Year ended March 31, 1920.

Fiscal Year.	Northwest Territories.	Migratory Birds Act.	Total revenue.	Refunds.	Net revenue.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1919-20.....	10 00	60 00	70 00		70 00

STATEMENT of Casual Revenue for the Fiscal Year ended March 31, 1920.

Fiscal Year.	Particulars.	Gross revenue.	Refunds.	Net revenue.
		\$ cts.	\$ cts.	\$ cts.
1919-20.....	Casual Revenue, Miscellaneous.....	20,099 27	1,278 94	18,820 33
1919-20.....	Casual Revenue, Northwest Territories.	2,738 60	75 00	2,663 60
		22,837 87	1,353 94	21,483 93

STATEMENT showing Net Repayments on account of Seed Grain and Relief Mortgages for the Fiscal Year ended March 31, 1920.

Year.	Gross collections.	Refunds.	Net receipts.
1876..	\$ 792 03	\$ 68 87	\$ 723 16
1886-7-8..	1,118 08	1 58	1,116 50
1890..	286 26	.....	286 26
1894	159 24	36 49	122 75
1895..	945 61	16 92	928 69
1896..	1,087 62	4 26	1,083 36
1901..	504 97	108 85	396 12
1905..	166 09	.....	166 09
1908..	3,891 94	60 72	3,831 22
1909..	687 96	81 97	605 99
1911..	5,380 10	31 08	5,349 02
1912..	9,485 47	246 44	9,239 03
1913..	1,235 50	4 21	1,231 29
1914..	3,338 25	20 18	3,318 07
1915..	675,730 22	23,436 23	652,293 99
1915—Relief.	373,394 31	2,291 01	371,103 30
1917..	8,547 82	22 74	8,525 08
1918—Seed grain..	37,769 14	772 57	36,996 57
1918—Relief.	1,871 81	110 77	1,761 04
1919—Seed grain..	25,338 82	14,398 80	10,940 02
1919—Relief.	122 71	.....	122 71
Relief advances prior to 1915..	3,500 69	85 56	3,415 13
	\$1,155,354 64	\$41,799 25	\$1,113,555 39

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DOMINION LANDS REVENUE (Cash and Scrip), for the Fiscal Year ended March 31, 1920, credited to the Special Accounts of the following Railway Companies.

Railway Company.	Date of Order in Council.	Amount.	Total.
		\$ cts.	\$ cts.
Lake Manitoba Railway and Canal Co.....	December 5, 1908.....	75,255 00	75,255 00
Canadian Northern Railway System.....			

STATEMENT of Gross Cash Receipts on account of Dominion Lands Revenue for the Fiscal Year ended March 31, 1920.

Source of Revenue.	Amount.
Homestead fees..	\$ 67,460 00
Sale fees..	120 00
Improvements..	78,913 74
General sales of land..	2,799,605 09
Timber dues..	589,780 21
Rental from grazing lands..	183,661 96
Export tax on gold, hay, coal, petroleum, mining fees, etc.. . .	896,413 40
Canadian National parks..	76,742 07
Survey fees..	18 68
Map sales, rentals, office fees and miscellaneous..	46,125 70
Total revenue..	\$4,738,840 85

STATEMENT of Gross Receipts (Cash and Scrip) on account of Dominion Lands Revenue for the Fiscal Year ended March 31, 1920, compared with the previous Fiscal Year.

Particulars.	1919-20.	1918-19.	Increase.	Decrease.	Net increase.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Dominion Lands Agencies.....	2,894,602 74	2,280,051 02	614,551 72		
Crown Timber Agencies.....	584,127 15	400,792 05	183,335 10		
Hay, mining, coal, grazing, etc.	1,085,980 26	767,938 29	318,041 97		
Yukon Territory.....	97,468 63	112,493 85		15,025 22	
Canadian National parks.....	76,742 07	55,006 72	21,735 35		
	4,738,920 85	3,616,281 93	1,137,664 14	15,025 22	1,122,638 92

During the fiscal year ending March 31, 1920, there were two public sales of Ordnance Lands held, one at Port Maitland and one at Ottawa, the latter being part of the Ordnance Reserve in lots 39 and 40, first concession, Ottawa Front, in the township of Nepean, now within the limits of the city. A more detailed report of these sales is given under the headings of the respective localities.

With respect to the properties previously sold or occupied under leases, in accordance with the provisions of the Ordnance and Admiralty Lands Act, or, under leases originally granted by the Imperial authorities, 11 whole lots or parcels and 4 part lots, situated in one or other of the localities hereunder mentioned and in the accompanying statement marked "A," were paid in full and letters patent issued therefor.

1. *Burlington Heights*.—Four lots in this locality previously sold and paid in full but, owing to the fact that satisfactory proof of title was not furnished at the time, letters-patent were not issued. During the last fiscal year, however, satisfactory proof of title was filed and registered in this branch and letters-patent for the said lots were accordingly issued.

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2. *Chambly*.—Two lots in this locality which were sold many years ago but not fully redeemed were paid in full and letters-patent issued. The balance of purchase money received was \$255.

3. *Nepean*.—Part of the Ordnance Reserve situated in lots Nos. 39 and 40, first concession, Ottawa Front, township of Nepean, now within the limits of the city of Ottawa, was subdivided into lots and offered for sale at public auction in November last. Of the 22 lots offered for sale 15 were disposed of for the sum of \$9,435. Of this sum \$3,795 was paid in cash; six lots having been paid for in full letters patent were issued.

There are six squatters in occupation of portions of this land for many years; these were permitted to purchase, at a valuation, their respective holdings and all took advantage of the privilege each paying one-fifth of the purchase price in cash.

4. *Ottawa*.—Lots in this locality are occupied by tenants in accordance with the provisions contained in the original leases granted by the Imperial authorities, with the privilege of converting their leasehold into freehold upon payment in cash, of the amount of consideration money placed thereon. During the last fiscal year 5 whole lots and 4 part lots were fully redeemed and letters-patent issued. The total consideration money received was \$1,195.

5. *Port Maitland*.—The remaining lots on the Ordnance Reserve situated on the west side of the Grand river at this point, consisting of six parcels, were offered for sale by public auction in August last, and sold at satisfactory prices. The total amount realized was \$1,402.20, of which \$1,014.04 was paid in cash. Two of the parcels sold were paid in full and letters-patent issued therefor.

The records of attendance covering the staffs of the various branches of this department which were formerly kept in the Ordnance Branch were transferred to the Accounts Branch.

NORTHWEST TERRITORIES.

In the capacity of Commissioner of the Northwest Territories, the work of co-ordinating the records of the Northwest Territories was undertaken and Mr. J. P. Dunne was placed, prior to the close of last fiscal year, in the important office of Secretary of the Northwest Territories in addition to the duties of Superintendent of Ordnance and Admiralty Lands.

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STATEMENT giving the number of lots and part lots sold or redeemed, the amounts for which such lots were originally disposed of and the sum received as instalment or balance of purchase money during the Fiscal Year ended March 31, 1920.

Locality.	No. of Lots sold or redeemed.	Amount of consideration of purchase money.	Amount received on account during fiscal year.	Remarks.
		\$ cts.	\$ cts.	
Ottawa.....	1	200 00	518 30	In full.
	1	65 00	168 53	"
	1	100 00	129 75	"
	1	190 00	193 80	"
	1	210 00	292 60	"
	1	105 00	146 30	"
	1	180 00	196 20	"
	1	25 00	25 00	"
	1	120 00	130 80	"
	1	221 84	221 84	"
Port Maitland.....	1	400 00	80 00	"
	1	345 00	345 00	"
	1	572 00	572 00	"
	1	85 20	17 04	"
	1	26 76	26 76	"
Nepean.. .	1	525 00	125 00	"
	1	550 00	550 00	"
	1	650 00	130 00	"
	1	525 00	105 00	"
	1	525 00	105 00	"
		525 00	105 00	
		600 00	120 00	
		550 00	110 00	
		550 00	110 00	
		500 00	100 00	
		1,350 00	270 00	
		775 00	155 00	
		725 00	725 00	In full.
		575 00	575 00	"
		510 00	510 00	"
		360 85	144 34	"
		210 25	210 25	"
		191 75	40 00	"
		208 65	208 65	"
		91 98	36 80	
		91 98	50 00	
		202 60	40 00	
		13,638 86	7,588 96	

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STATEMENT naming the various localities where Ordnance Lands are situated on account of which moneys have been received during the Fiscal Year ended March 31, 1920.

Locality.	Total.
	\$ cts.
Amherstburg.....	2 00
Burlington Beach.....	2 00
Carillon.....	0 20
Elmsley.....	8 10
Edmundston.....	1 00
Fort Cumberland.....	64 00
Fort Erie.....	2 00
Grand Falls.....	10 30
Grenville.....	2 00
Kingston.....	204 50
Montague.....	4 00
Nepean.....	4,718 74
Oxford.....	3 85
Ottawa.....	1,965 28
Owen Sound.....	81 40
Port Maitland.....	1,300 96
Prescott.....	2 00
Point Edward.....	200 00
Queenston.....	2 00
Quebec.....	780 00
St. Joseph's Island.....	125 00
St. Croix River.....	2 00
Sorel.....	210 50
Shelburne.....	6 00
South Crosby.....	2 00
Wolford.....	50 00
	9,749 83
Fees.....	90 50
Total.....	9,840 33

STATEMENT showing the receipts each month of the year classified as fees, rents, or interest equivalent to rent and principal for the Fiscal Year ended March 31, 1920.

Month.	Fees.	Rent or Interest.	Principal.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1919.				
April.....	24 00	645 23	265 00	934 23
May.....		181 65	221 84	403 49
June.....		1,122 60		1,122 60
July.....	5 50	10 50		16 00
August.....	14 50	83 55	1,304 04	1,402 09
September.....		25 82		25 82
October.....	23 00	71 90	26 76	121 66
November.....	12 00	306 90	4,315 00	4,633 90
December.....		215 50	574 47	789 97
1920.				
January.....	4 00	114 00	25 00	143 00
February.....	5 00	107 50		112 50
March.....	2 50	2 00	130 57	135 07
	90 50	2,887 15	6,862 98	9,840 33

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STATEMENT showing amounts due and unpaid on account of purchase money and rent or interest for the Fiscal Year ended March 31, 1920.

Locality.	Rent or Interest.	Principal.	Total.
	\$ cts.		\$ cts.
Burlington Beach.....	278 20	.....	278 20
Beaver Harbour.....	10 00	.....	10 00
Chambly.....	164 00	.....	164 00
Dalhousie.....	26 45	.....	26 45
Elmsley.....	1 60	.....	1 60
Fort Erie.....	117 70	.....	117 70
Grand Falls.....	430 96	.....	430 96
Marlborough.....	12 84	.....	12 84
Niagara.....	760 30	.....	760 30
Nepean.....	118 85	.....	118 85
Owen Sound.....	2 50	.....	2 50
Oxford.....	1 60	.....	1 60
Oromocto.....	1 00	.....	1 00
Ottawa.....	815 24	.....	815 24
Port Maitland.....	32 00	.....	32 00
Presqu'isle.....	5 00	.....	5 00
Sorel.....	137 40	.....	137 40
Tay.....	44 00	.....	44 00
Wolford.....	120 40	.....	120 40
	3,080 04		3,080 04

PART II.

DOMINION PARKS.

REPORT OF THE COMMISSIONER, J. B. HARKIN.

The reports of the field officers of the Dominion Parks Service appended hereto recite the particulars of the work carried on during the fiscal year ending March 31, 1920. In all the parks many activities which had necessarily been suspended during the war were renewed and while labour conditions were nowhere normal, considerable progress was made in many lines of work.

TOURIST TRAVEL.

Tourist travel to all the parks showed a marked increase during the year, the outstanding feature being the revival of travel by rail. As was anticipated the cessation of the war with all its attendant anxieties produced in many the desire for change and recreation and, possibly because of the part she had played in the conflict, hundreds of thousands turned their eyes towards Canada. In consequence the parks had the best season since 1915—the year of the Pacific Coast Expositions. While the total number of visitors did not reach the figures of that or some preceding years, this was due to the fact that large numbers of visitors, instead of remaining for only a few days in the parks, stayed for weeks at a time and many for the entire season. This necessarily limited the available accommodation. During July and August there was scarcely a day in which visitors who wanted to stay over but who had not made reservations in advance, were not compelled to go on to other points. The great hotels at Banff and Lake Louise were crowded practically up to the end of September and the smaller hotels were almost equally taxed. Every cottage available in Banff was occupied and several lodging-houses added tents to their accommodation. Similar conditions prevailed at Emerald Lake, Yoho Camp, Glacier and Jasper.

I think we may look forward to this large volume of travel being maintained and even increased for several years. Limited accommodation and high prices in Europe will undoubtedly restrict travel abroad for some time and in the meantime the attractions of the Canadian Rockies are becoming more widely and favourably known. The most pressing problem would appear to be one of increased accommodation. This is particularly urgent in Yoho and Jasper parks. Both of these parks possess scenery worthy of attracting as heavy a traffic as Banff but owing to the limited accommodation they receive only a small percentage of the travel which they otherwise might. It is greatly to be hoped that first class hotels will be built at both these places in the near future.

While the number of visitors by motor to Rocky Mountains park did not show any marked increase over the large traffic of the previous year, this was no doubt due to the unusually dry season which rendered motoring unpleasant on account of the dust and to the fact that the road to Lake Louise is not yet open. Waterton Lakes park, however, which can be reached only by motor, had the biggest year in its history and Buffalo and Elk Island parks, which are attractive objectives for prairie motorists, also showed large increases.

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There are many signs that Canadians as a whole are realizing more clearly the immense potential values of tourist traffic. The campaign inaugurated by the Canadian Manufacturers' Association, the organized efforts being put forth by the provinces of British Columbia and New Brunswick and the Victoria Island Association are important steps in this connection and will undoubtedly help to stimulate travel and thus increase the prosperity of the country. As I have pointed out before, the benefits from tourist traffic are not confined to any one place. Once the stream of travel is set in motion it enriches many shores. Thousands of tourists, for instance, who are attracted to Canada by the fame of the parks, visit Calgary, Vancouver and Victoria en route, and vice versa, many who visit these cities learn of the parks and go on to see them. Figures compiled by the Canadian Pacific Railway passenger department in Winnipeg and published in the *Winnipeg Tribune* of February 9, 1917, showed that 42 per cent of the total number of visitors to the parks in that year, or 43,470, came to Winnipeg and spent there on an average \$10 apiece or \$434,700 in all. Other cities would benefit proportionately.

TOURIST BUREAU.

In previous reports it has been stated that the magnitude of the revenues involved in tourist travel warrant the creation of a tourist bureau on the part of the Federal Government. In this connection it is interesting to note that the Secretary of the Interior at Washington in his latest report says: "I cannot too strongly recommend the establishment of a travel division in the National Park service. It is vitally important to the nation and our bureau is certainly the place for it because no other agency of the Government is so interested in or closely connected with the touring public as is this service." He goes on to point out the advantages of bringing the tourist industry under Government supervision and says: "A division of touring could co-operate closely with the resorts of the nation, whether in a national park or not, and by issuing promotive literature under the stamp of the approval of the department and the Service could more effectively stimulate travel in the United States than any other agency because its data would not be selfish or exaggerated and would have the confidence of everybody using it."

The Office of Touring, the special bureau organized by the French Government for the development of tourist traffic to France, has developed a very active policy. At the last sitting of the Chamber of Deputies, a bill asking for a vote of 30,000,000 francs was brought down, the money to be applied to the construction of tourist hotels and the purchase of 220 sight-seeing automobiles. France has realized that the development of a large tourist revenue will be one of the easiest means of defraying part of her national debt. She hopes, it is said, to attract not less than a million tourists next year and their expenditure will undoubtedly do much to restore prosperity to the devastated regions.

It is well known that tourist travel follows the line of greatest stimulation. No matter how many attractions a country possesses a large tourist traffic will not develop unless some effort is made to attract it, but as I have pointed out before there is no industry in which a comparatively small investment will bring such enormous returns. Canada possesses undoubtedly, as our orators often declare, a "wealth of natural scenery," but this wealth is at present only potential and whether we draw large revenues from it or not depends entirely upon a policy of development. It seems probable that the time may soon come when the tourist industry will not only be organized but standardized. This has already been done to a certain extent on the continent where the traveller is practically assured of finding certain standards of comfort, cleanliness and refinement wherever he goes. In this country, however, there is still much to be done in the way of establishing standards.

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There are several reasons why the development of an organized policy respecting tourist traffic should be of interest to Canada to-day. In the first place, she possesses an unfavourable balance of trade, and, as I have pointed out in previous reports, one of the best methods of offsetting an unfavourable trade balance is by bringing foreign money into the country through tourist traffic. She possesses, moreover, on the one hand an immense potential wealth of natural scenery—she has an ideal summer climate; she has over 3,000 miles of salt-water beach; she has her great inland mountain and lake regions; her immense Rocky Mountain area and her Pacific coast, all of them capable of attracting traffic to an almost unlimited degree. She has the raw material, but her industry is not developed. On the other hand, she has a winter climate which causes large numbers of her own people to seek more southern countries for several weeks each year. This loss is inevitable, as is the loss caused by the expenditure of Canadians abroad at other seasons. The organized efforts made by other countries to attract tourist travel tend increasingly to augment both these sources of loss. She can only counteract it by developing her own resources. Undoubtedly the conditions in Canada for such development are right, but the industry needs fostering. As an example of what may be done, take the record of the city of Los Angeles. In 1892 the population was approximately 60,000. It is to-day actually 575,000, and its growth has been almost entirely caused by tourist traffic. Tourist traffic to Canada is capable of a similar development, and as I have said in previous reports, I believe that the best results can be obtained by the creation of a Federal Tourist Bureau working in co-operation with provincial governments, municipalities, motor associations, etc., as well as with the railways and large transportation interests.

BANFF GOLF LINKS.

Early in the year the services were secured of Mr. Donald J. Ross, who is considered one of the best golf course experts in America, to advise regarding the best plan to be followed in enlarging the Government golf course at Banff from a nine to an eighteen hole course. Complete plans of the layout, showing the position and details of the traps, bunkers, tees, etc., were received in September, and an immediate start was made on the work of enlarging the course. While the work is not yet completed, considerable progress has been made. The course, when finished, will be one of the finest on the American continent. In order to provide the necessary water supply for the links a 4-inch water main was laid early in the year to connect the 6-inch main at the Spray river bridge with the existing distributing main at the golf course.

NEW BOW RIVER BRIDGE.

During the year plans were prepared for a new bridge over the Bow river at Banff. The old steel structure which is no longer adapted to carry the traffic is to be replaced by a concrete bridge of artistic design which will add much to the general appearance of the town. It is expected that construction operations will be commenced during the coming year.

CASTLE-LAKE LOUISE HIGHWAY.

Tenders were called and a contract awarded for the final eleven miles of the Castle-Lake Louise highway and the construction of necessary bridges. Clearing and grubbing operations were carried on over the entire contract, but owing to the great difficulty experienced in getting and keeping labour, certain sections were not fully completed when the early fall put an end to operations. The same conditions interfered with progress work on the Mount Revelstoke motor road and the Mount Edith Cavell highway. On the latter road tenders were called and the contract awarded

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for the construction of the section from Station 308x00 to Station 864x00. Clearing operations were carried on to Station 630, and grubbing to Station 493. Partial grading operations were undertaken on miles 7, 8, 9 and 10 of the contract. Most of the grading work done was on mile 9, where the steep side-hill is travelled by means of a series of switchbacks. Owing to the early winter the contractor suspended operations on October 31 without completing all the work covered by the contract.

ATHABASKA RIVER BRIDGE.

Plans were prepared for a new steel bridge over the Athabaska river near Jasper. Concrete abutments for the bridge were designed and construction started during the winter months. Part of the rock cut forming the approach to the bridge site was also removed during the winter.

BANFF-WINDERMERE HIGHWAY.

Under the terms of the agreement entered into between the Government of the Dominion of Canada and of the province of British Columbia, the Dominion agreed to complete the unfinished portion of the Banff-Windermere highway within four years from the conclusion of peace in the Great War in return for the province transferring to the Dominion a strip of land within the province of British Columbia extending five miles on each side of the said highway, and containing an area of approximately 590 square miles. As a considerable portion of the highway constructed by the provincial government had been destroyed by high water, tenders were called by this branch for the reconstruction of the portion of the Sinclair division of the above highway from Station 106 to Station 282, and a contract for the work was awarded. Work on this contract is still in progress, and it is expected this section will be completed during the coming summer. Repair work was also undertaken by the department on portions of the old roadbed above and below the contract work, and log jams which had formed in Sinclair creek and were a menace to the roadway were removed. On the northern or Vermilion end of the road some necessary maintenance work was carried out in order to prevent further damage to the constructed portion of this section of the highway. With a view to future construction work, surveys were undertaken northerly from Kootenay river crossing to the present graded portion of the Vermilion division of the highway. Twenty-eight miles of highway comprising the unconstructed Simpson and Vermilion divisions were located and are now ready for construction operations.

The completion of this road will undoubtedly mean much to the future of Rocky Mountains park. It opens up a loop route through the Canadian Rockies which will contain more scenery to the square mile than probably any other motor road on the continent. The eastern end of the road is already connected via Calgary and Macleod with the road to the United States Glacier park and thence with the National Park-to-Park highway. The western end leads via Cranbrook and Bonner's Ferry to Spokane, where it connects with the Sunset and Pacific Coast highways by direct route to California. What this will mean to the Rocky Mountains park it is difficult to estimate. The through travel on the Columbia river highway is said to be about 500 cars per day. At Crown Point, according to Herbert Nunn, State Highway Engineer for Oregon, the number of machines one way has reached 2,500 in one day. C. A. Collins, Field Secretary of the Evergreen National Highway Association, at the annual meeting of the trustees in Tacoma last summer, presented some interesting figures showing what such motor traffic had meant to California. According to the *Victoria Times* of June 21, 1919, he said: "Four thousand two hundred and forty cars were brought into California in one year over a single road! Allow an average of four passengers to the car, an average daily expenditure per

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person of five dollars for accommodation and entertainment, figure that these people stayed in California from one to three months, and the result will show why California gives so much attention to road signs, auto clubs and publicity work for tourists."

The Canadian parks can confidently look forward to a steadily increasing volume of motor travel. The director of the United States park service in his report for 1919 comments upon the astonishing increase in the number of cars visiting the United States national parks. In 1918 the number of private cars totalled 53,966. In 1919 there were 97,721 cars, or an increase of nearly 80 per cent. He goes on to say: "The unprecedented travel of the season just closed demonstrated to cities and towns far distant from the national parks that these great playgrounds were the most powerful magnets for motoring tourists that the western country possessed." That the Canadian parks are not inferior in attractions to the United States parks was evidenced by an incident which occurred last summer. A party under the auspices of the *Brooklyn Eagle* made a park-to-park tour by train through several of the United States parks and included the Canadian Rocky Mountains park in its itinerary. At the conclusion of the tour a vote was taken as to the respective merits of the various parks and hotels which they had visited. Here is the result of the vote:—

<i>Most popular park.</i>		<i>Most popular hotel.</i>	
	Vote.		Vote.
Canadian Rockies (Banff, Lake Louise).	24	Banff Springs..	21
Mount Rainier..	19	Glacier Park..	17
Glacier..	17	Canyon (Yellowstone Park)..	17
Yellowstone..	9	Chateau Lake Louise..	10
Rocky Mountains..	8	Antlers (Colorado Springs)..	9
All National Parks..	3	Old Faithful Inn..	5
Canadian and Glacier..	2	Metropole (Denver)..	2
Yellowstone and Glacier..	1	Edgewater Beach (Chicago)..	1
Yellowstone and Rainier..	1	Thermopolis (Carter Sanitarium)..	1
Rainier and Glacier..	1	Davenport (Spokane)..	1
Rainier and Canadian..	1	Many Glacier..	1
		"Pullman Train"..	2

As soon as the Vermilion-Sinclair road is completed the Canadian parks will automatically become part of the United States park-to-park system of highways forming a link in what will be an international park-to-park route unequalled in the world. There is I believe no room for jealousy between the two park systems. The aims of both are identical and they cannot help rendering an international service to each other. Everything that is done by the United States service to make its parks more attractive will help to swell the tide of travel which will eventually touch the Canadian parks and vice versa every improvement in the Canadian parks will have a similar effect where the United States parks are concerned.

FOREST PROTECTION.

Owing to the very dry season much anxiety was felt in the parks on account of the danger from fire. A considerable number of fires broke out but owing to the vigilance of the warden service and to the portable fire engines with which all the parks are now equipped, the damage was in almost all cases confined to a small area. One thousand three hundred and ninety-six miles of trails were patrolled by the wardens during the year. The forest protective system now includes:—

SCENIC PARKS IN ROCKIES.

Wardens..	46
Warden's cabins..	66
Miles forest telephone lines..	256.25
Phones..	66
Portable fire units..	25
Hose..feet.	36,800
Pyrene and chemical fire extinguishers..	100
Speeders..	14
Gas masks..	22

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EXPERIMENTAL WORK.

A good deal of investigation work was done with regard to the development of further modern equipment for forest protection. The use of gas in the Great War suggested its possibilities as an extinguisher of forest fires. There are several well known gas producing chemicals in liquid form but the problem of transportation in the mountains made it desirable to discover a material in the form of a powder. Experiments were made with tetra-chloride and several other chemicals but it was found that in the open air the resulting gases became diluted so rapidly that their effectiveness was lost.

The branch has developed a chemical mixture of its own known as "Pyrox" in liquid form, which appears to be an excellent fire quencher and possesses great fire-resisting properties as well. The liquid can be readily and cheaply manufactured and the experimental tests which have been made showed it to be most satisfactory for the purpose. It is believed that this liquid can be reduced to powder form and experiments will shortly be made in this connection. The use of chemicals to destroy vegetation along railway rights of way, fireguards, etc., was also investigated and experiments were made with two different liquids—light oil and acid sludge. Both of these it has been shown will successfully destroy vegetation for one year but it is hoped that they will prove effective for two or three years in succession. This would materially lessen the present labour and expense entailed in the ploughing of fireguards particularly at Buffalo and Elk Island parks and would be an additional protection along railway rights of way.

WILD LIFE IN THE PARKS.

The continued increase of practically all forms of wild life is very gratifying. It affords incontrovertible evidence of the value of sanctuary protection. The superintendent of Jasper park reports that at the close of last season there were estimated to be 5,000 bighorn now within the boundaries of that park. A few years ago their numbers had been reduced to a minimum. As was anticipated there is already a natural overflow into the areas contiguous to park boundaries. Reports received from sportsmen show that there were last fall approximately 2,000 bighorn between the Forks of the Macleod and the Southesk rivers. A British Columbia authority recently estimated that each head of big game was worth \$1,000 on account of the money brought into the province through the wealthy sportsmen it attracted. On this basis the increase from Jasper park into the Southesk country alone has added \$2,000,000 to the value of the natural resources of Alberta. This is only one district. Similar reports are received from practically all hunting areas.

A notable addition was made to the wild life of the parks by the introduction of a herd of elk which was secured through the courtesy of the United States Government from Yellowstone park, Wyoming. Owing to the severe winter the elk herd in that park were threatened with starvation and an opportunity was offered the Canadian Government of obtaining several hundreds of these animals. The elk were brought over in very severe weather but suffered only a small percentage of loss. They were liberated in Rocky Mountains and Jasper parks and up to the present appear to be doing well.

Buffalo.—The main herd of buffalo in Buffalo park by actual count numbered 4,868 at the end of the fiscal year. The decrease for the year was 41. Of this number 21 were slaughtered to save valuable heads and hides and 20 died, mostly through injuries caused by fighting. The superintendent reports that fully 50 per cent of the main herd are bulls. As the proper proportion between the two sexes in a buffalo herd is one bull to every two cows, there are at least 1,000 surplus males. This tends to weaken the strength of the herd. During the past year investigations have been

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carried on with a view to the commercial disposal of the surplus males in the immediate future. A test lot of mounted heads was sold by public auction at the Canadian fur sales at Montreal last March and brought the following prices: Small buffalo bull head, \$300; medium buffalo bull head, \$610; and large buffalo bull head, \$1,025. Owing to the use of limousines by the wealthy there is less demand for robes than formerly; however, good hides dressed for robe purposes sold last March in Montreal for \$120 each.

It has also been demonstrated by practical tests that, when properly treated, excellent sole leather for boots can be made of the buffalo hides. The leather is both strong and flexible and is said to be as valuable as good cowhide. Owing to the present scarcity of leather it appears that buffalo hides will find a ready market for this purpose if unsuitable for robes or other purposes.

Experiments in a small way have also been carried on with a view to the utilization of buffalo wool and the results are very promising. There are some difficulties in manufacture through the admixture of coarse hair but inquiries indicate that existing machinery can be adapted to handle this problem. One of the outstanding features of the yarn is its extraordinary strength. While it may not be suitable for the finer grades of woollen products there seems a good future for it with respect to coarser articles.

The Department of Agriculture in connection with its cattalo experiments, last winter submitted samples of buffalo and cattalo meat of the same age and condition to twenty-six householders with a view to securing opinions as to the palatability of these meats compared with domestic beef. Only three persons declared the domestic beef superior in taste, the preponderance of opinion favouring the buffalo beef. There is reason to believe, therefore, that a market may be developed without great difficulty by the sale of buffalo for meat purposes.

A request was received during the year from Prof. A. N. Shaw, of the Department of Animal Husbandry, University of Saskatchewan, to take six buffalo calves from those born this season with a view to making experiments in domestication. As is well known, attempts to tame buffalo have been successful in individual cases in the past but it is the hope of the Animal Husbandry Department to continue the experiments until a domestic strain has been produced. Permission for the granting of the necessary calves has been granted and the experiments will be watched with much interest.

PARK FARM.

The farm maintained in connection with Buffalo park continues to prove a financial asset. Last year about 400 acres were seeded to oats and 200 acres were summer fallowed. The season's operations resulted as follows:—

Oat crop—8,000 bushels, of which 1,700 were fed to animals, remaining 6,300 threshed, value 90 cents per bushel... ..	\$ 5,670 00
Hay—500 tons at \$35 per ton... ..	17,500 00
Total (exclusive 1,700 bushels fed to animals, and straw) .	<u>\$23,170 00</u>

Antelope.—The Government prong-horned antelope herd at Nemiskam, Alberta, continues to thrive and attracts many visitors. Under the supervision of a caretaker who keeps fences in repair and patrols the reservation, the original 42 antelope have increased to about 100 and, owing to the fact that the reserve contains practically everything needed in the way of vegetation and saline deposits no indication of disease has appeared. So far as known this is the most successful attempt which has yet been made to breed antelope in captivity.

Point Pelee Park.—The results of sanctuary protection are already apparent in Point Pelee park. Although this area was set aside as a park only two years ago it already shows a large increase of animal and bird life. The superintendent reports

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an abundance of birds during the season and also large increases during migration. The few coveys of quail which were within the park upon its establishment have increased to over 100. The increase in muskrats is also very satisfactory. During the past year it was estimated that there were 2,000 dwellings with an average of six inhabitants each or a total of 12,000 muskrats in the park. At the prevailing price of skins of from \$4 to \$5 the value of this form of wild life represents over \$50,000. Wild rice and celery are being planted along the shores of the lake with a view to increasing the supply of bird food and efforts are being made to assure the maintenance of normal water levels in order to preserve plant life which forms the food of both wild fowl and muskrats. The destruction caused by carp has also been investigated and steps are being taken to eradicate these fish which have proved to be a dangerous enemy to several forms of wild life.

HISTORIC AND PRE-HISTORIC SITES.

The work with respect to the preservation of historic and pre-historic sites, which had been laid aside on account of the war, was resumed during the year and an important step taken in this connection. This was the formation of what is known as the Historic Sites and Monuments Board. In carrying on this work it had been found that the development of a policy covering so wide a field demanded expert knowledge with regard to practically all the historic sites in Canada and their relative value. The Government, therefore, thought it advisable to endeavour to secure the assistance of experts intimately acquainted with these matters and a number of prominent Canadian historians kindly consented to serve as members of an advisory board. The board, which serves without remuneration, is composed of the following: Chairman, Brigadier-General E. A. Cruikshank, Ottawa; Dr. James H. Coyne, St. Thomas, Ontario; Dr. Benjamin Sulte, Ottawa; Archdeacon W. O. Raymond, St. John, N.B.; W. C. Milner, Halifax, N.S.; and the Commissioner of Dominion Parks. The initial meeting was held in Ottawa in October, 1919, when it was decided that the first matter which required to be undertaken was a comprehensive survey of Canadian historic sites. This is now being made by the members. When this survey is completed the board will be in a position to advise the department as to which sites should receive attention from the Federal Government and what work in connection with them should be undertaken. In addition to the meetings of the general board which it is expected will not be held more than once or twice a year, the members resident in Ottawa meet to discuss details when occasion arises.

The co-operation of historical societies and other associations, public libraries, etc., interested in the preservation of the Dominion's historical remains was solicited and the response received was very gratifying. A design for an artistic tablet to be used in connection with the marking of existing remains as well as of a cairn which is to be erected at sites where there are no remains are in course of preparation.

PUBLICITY.

Owing to the restricted appropriations no new parks literature was issued during the year. The large number of requests for pamphlets, however, has practically exhausted all our editions and fresh publications will have to be considered for the coming year. Material for some of these is now in course of compilation. A series of news items was furnished for the British press and a number of articles prepared for Canadian and United States magazines. In co-operation with the Exhibits and Publicity Branch of the Department of Trade and Commerce, several films taken in the different parks were edited. Over a thousand coloured slides were loaned for lecture purposes and lecture material supplied. Illustrated lectures were also given by officials of the branch and several hundred photographs and enlargements were sent out on request.

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ST. LAWRENCE ISLAND PARKS.

An important addition was made to the St. Lawrence Island parks by the purchase of what was formerly known as Doran's or Sheep island, directly opposite the town of Morrisburg. This island which was originally part of the St. Regis Indian Reserve, had been leased by the Indians for a term of years to a private individual. At the expiration of the lease the Department of the Interior requested the Department of Indian Affairs to be allowed to acquire it for parks purposes. The island has been named Broder park in memory of the late Andrew Broder, who for many years represented Dundas in the House of Commons. It is one of the finest of the island reservations, covering about twenty acres, well wooded and possessing a good bathing beach as well as suitable grounds for baseball and other sports.

VISIT OF THE PRINCE OF WALES.

His Royal Highness the Prince of Wales with his staff spent five days in the parks on his tour through the West in September. On his arrival at Banff he was met by guards of honour composed of local war veterans, Stoney Indians and Mounted Police. In reply to the address of welcome on behalf of the English residents of the park His Royal Highness said in part:—

“It is a very great pleasure for me to be setting foot for the first time in this wonderful park, and I thank you most sincerely for your cordial welcome which has touched me very much.

“I have long looked forward to seeing for myself the wonderful scenery which surrounds you here. Its grandeur and its beauty have drawn visitors for many years from all parts of the world and I am glad to think that a very large proportion of those visitors has come from the British Isles. The numbers who come here in future must continually increase and you may rely on me not only to spread the knowledge of your attractions in Great Britain when I return, but to come here again myself whenever the opportunity occurs.

“I thank you for your warm expression of loyalty to my father, the King, who retains the happiest memories of his visit to Banff. The Canadian Government has deserved well of the people of Canada in preserving this wonderful district in all its natural beauty for generations to come. I hope that it will be a place of rest and refreshment within the reach of increasing numbers of every class as the years go on.”

After the ceremony in English an address of welcome in the Stoney language was presented and His Royal Highness was made a chief of the tribe with the title “Chief Morning Star.”

PROTECTION OF MIGRATORY BIRDS.

The organization for the enforcement of the Migratory Birds Convention Act in Canada was gradually expanded to meet existing conditions during the fiscal year 1919-20. Obviously the localities requiring the most attention were those in which provincial law was not in conformity with the treaty with respect to the protection of migratory birds. For this reason, the first steps in the development of the federal service were taken in the Maritime Provinces. The province of New Brunswick repealed its laws protecting migratory birds about the time that the federal Act was passed. The province of Nova Scotia, although making its law conform with the treaty in other respects, provides no protection for the sea ducks, and although the province of Prince Edward Island concurred in the Migratory Bird Treaty, its laws do not yet conform with that treaty, nor with the federal law.

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A temporary staff of migratory bird wardens was organized in the Maritime Provinces in March and April, 1919, consisting of nine full-time and two part-time men. Of these men, one was placed in charge of the migratory bird work in each of the Maritime Provinces. Returned soldiers were appointed to fill all the full time positions and although not specially familiar with the birds, their work was uniformly of an excellent character, both with regard to publicity concerning the law and law enforcement.

During the fall of 1919, examinations were held by the Civil Service Commission, and the migratory bird warden staff in the Maritime Provinces was made permanent.

A staff of honorary game officers is being appointed throughout Canada to serve primarily as an information service. These officers are given the authority of game officers with the power of police constables under the Act and can consequently enforce the law in their own localities. At the present time many districts, especially those surrounding the larger cities, are well patrolled by this staff which now consists of about sixty-three officers and which it is expected will be augmented until there will be a bird friend in practically every community. Persons interested in the protection of our native birds can render a great service by undertaking this work. Although the positions are purely of an honorary nature, these officers are entitled by law to one-half of the penalty imposed in cases which they may bring to court.

The extension of the jurisdiction of the Royal Canadian Mounted Police to the whole of Canada will prove, without doubt, an important factor in the operation of this bird protective measure. Steps are now being taken to have all members of this force made game officers under the Act. The Department of the Naval Service has also offered to assist by having officers on its patrol boats made game officers, and it is believed, that this will prove of great assistance in having the law observed in such localities as the north shore of the gulf of St. Lawrence where many complaints have originated in the past.

Officers of the branch have co-operated with the preventive officer of the Department of Customs, which department is in charge of the enforcement of the prohibition which has been placed upon the import of wild bird plumage. An officer of the Department of Indian Affairs has also assisted the Parks Branch by acting as a game warden on the Quebec Labrador coast.

The trumpeter swan, which has long been considered almost if not quite extinct, was found to be wintering in numbers in southern British Columbia, and a temporary part-time game officer was appointed to see that these birds were unmolested. This appointment has been justified and it is a pleasure to report that the birds have now returned to their northern breeding ground without mishap.

PUBLICITY.

The work of educating the public with regard to bird protection has been carried on vigorously during the year. Seven pamphlets in English and six in French have been distributed. In almost all cases these have been sent first of all to the press throughout Canada and the press have reprinted them so widely that they have reached an enormous number of people. The number of each pamphlet printed has ranged from five to fifteen thousand, and they have been distributed where it was believed they would do the most good. Special care has been taken to place schools and educational institutions on the mailing list. The titles of the pamphlets already distributed are as follows:—

Canada's Feathered Friends, by Hoyes Lloyd.

Vanished and Vanishing Birds, by P. A. Taverner.

Why Canada and the United States Combined to Stop Spring Shooting, by J. H. Fleming.

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- No Spring Shooting Means More Migratory Game, by Hoyes Lloyd.
The German Badge of Cruelty, by Hoyes Lloyd.
The Brant of the Atlantic Coast, by Dr. R. M. Anderson.
Protection of Bird Neighbours, by Hoyes Lloyd.
Les Oiseaux Amis Du Canada, par Hoyes Lloyd.
Les Oiseaux Disparus Et Ceux Qui Sont A La Veille De Disparaitre, par P. A. Taverner.
Pourquoi Le Canada Et Les Etats-Unis Se Sont Unis Pour Mettre Fin a La Chasse Du Printemps, par J. H. Fleming.
La Prohibition De La Chasse Au Printemps Assure Une Plus Grande Quantite De Gibier Migrateur, par Hoyes Lloyd.
La Bernache Commune De La Cote De L'Atlantique, par R. M. Anderson.
Les Oiseaux Savages, par Hoyes Lloyd.

The total distribution to date has been 70,500 numbers and a supply of about 50,000 of these pamphlets still remains in stock.

Whereas the pamphlets have been written from a general point of view, many articles have been furnished the press which deal more particularly with local conditions. These have usually been printed by the press, which has given excellent support in this work whenever asked. Press articles of this nature have been furnished on such subjects as the destruction of crops by geese, the abolition of spring shooting, the band-tailed pigeon of the Pacific coast. An extract of the Canadian federal game laws was furnished the press of Newfoundland so that Newfoundland fishermen would be familiar with and observe this law when in Canadian waters.

A very successful series of lectures was given at the Canadian National Exhibition at Toronto, and the Central Canada Exhibition, Ottawa, and in addition a number of lectures were delivered to various societies. These have all been illustrated by motion pictures or lantern slides, and occasionally both have been used. The total number of lectures by the head office staff of the division during the year has amounted to more than thirty.

In co-operation with the Exhibits and Publicity Bureau of the Department of Trade and Commerce a number of motion picture films have been prepared. These include a very interesting picture of the pelicans and other birds at Johnson lake, Saskatchewan, which has been widely distributed under the title of "A Bird City." Another film, which shows the wonderful results obtained by Mr. and Mrs. J. C. Middleton, of London, Ont., in feeding wild birds will shortly appear under the title "Our Wild Life." The year's work in this line was closed by a picture which may yet prove to be one of the most wonderful of recent wild life pictures. After overcoming great difficulties because of the wariness of the birds, a splendid film showing the trumpeter swans wintering in British Columbia has been taken and is now being prepared for distribution.

BIRD SANCTUARIES.

Much time has been spent in listing the lands to be included in bird sanctuaries, in the West and, now that these lists are practically complete, the creation and control of this great series of sanctuaries should go forward at once. Sanctuaries to protect the breeding grounds of the waterfowl of North America are certainly essential, especially when we consider that the United States is providing similar sanctuaries to protect our birds on migration and on their winter feeding ground.

PROSECUTIONS.

Although most of our efforts have been centred upon acquainting the public with the law and with the desirability of protecting our valuable bird life, it has been necessary upon some occasions to take court action against offenders under this law.

Officers of the branch have prosecuted sixteen cases, one of which was appealed, and sixteen fines have been imposed by the court amounting to one hundred and seventy dollars (\$170). Confiscations of arms, plumage for millinery purposes, and game in cold storage amounted to eight lots. It is hoped that the publicity given these cases will have a beneficial effect in preventing further breaches of the law in the same localities.

INVESTIGATIONS.

Several investigations have been made, because birds were reported to be seriously damaging crops. In one locality, during the spring of 1919, complaints were very numerous against Canada geese, which were said to be destroying the growing fall wheat. After the fall wheat was well grown, an officer of the Department of Agriculture inspected the fields reported to be damaged, and he placed the total damage done by the birds at eight dollars (\$8). Similar complaints were received concerning the band-tailed pigeons in British Columbia. As the band-tailed pigeon is one of the species given special protection by the treaty, it was not felt that any action should be taken upon such complaints, unless the damage caused was really serious. As a matter of fact, one permit was issued to take these birds, but none were taken under it. Fifty-one permits were issued to take migratory birds for scientific purposes, although no birds were taken under many of these permits. It is felt that there are still many persons who do a certain amount of ornithological collecting who have not taken out permits.

WOOD BUFFALO PATROL.

The wood buffalo patrol to protect these animals in northern Alberta and the adjoining section of the Northwest Territories in the vicinity of Fort Smith was maintained throughout the year. Wolves are apparently a serious menace to this herd, and it is possible that special action should be taken to control them on the Buffalo Range. Trails have been cut and cabins are being built by the officers of the patrol, so that they can make frequent trips through the main area occupied by the buffalo. Their equipment is being improved, and horses furnished them, so that the patrol will have means of transport and remain at a maximum efficiency.

NORTHWEST GAME ACT.

The Royal Canadian Mounted Police have continued to administer this Act throughout the year, and, now that the inhabitants of the territory have been made acquainted with the provisions of the law, its effect should be felt. Licenses under the Act have been issued, as follows:—

LICENSES ISSUED.

Resident Hunting.	Trading.	Non- Resident Hunting.	British Trading.	Non- Resident Hunting.	Non- British Trading.
24	34	3	1	5	0
21	71	2	1	6	1
40	10	11	1	5	0
5	18	1	0	1	1
18	9	0	0	5	6
8	3	0	0	0	0
15	8	1	1	0	1
131	153	18	4	22	9

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The fur returns for the year ending June 30, 1919, are yet far from complete, but the summary reported to date is given below:—

Moose..	80	Lynx..	161
Caribou..	55	Skunks..	162
Deer..	4	Ermings..	2,850
Otter..	122	Bears..	430
Beaver..	3,257	Foxes..	847
Marten..	5,539	Red Fox..	34
Fisher..	47	Blue Fox..	24
Mink..	1,311	Cross Fox..	5
Muskrat..	50,578	Silver Fox..	3
Wolves..	193	Black Bear..	15
White Fox..	4,764	Brown Bear..	4
Wolverines..	370		

In connection with the general interest in fur farming, it may be of interest to mention that one such farm is being operated in the vicinity of Great Bear Lake, Northwest Territories. The regulations under the Northwest Game Act have been amended to prevent hunters and trappers other than Indians and Eskimos from operating in Banks Island, Northwest Territories, and a further amendment to the regulations allows the remission of fees for hunting licenses to members of the Royal Canadian Mounted Police when on duty in the Territories.

An amendment to the Act itself has been proposed, as it appeared that the open season for muskrat, north of latitude 64, closed on the 14th day of May, and the new amendment allows this animal to be taken until June 14. At the same time, it is proposed to amend the Act so that similar adjustments in the open season for any species may be made by Order in Council.

The wolf bounty paid during the year amounted to fourteen hundred and eighty dollars (\$1,480), and the gross revenue received for licenses during the year amounted to twenty-four hundred and forty-one dollars (\$2,441).

MUSK-OX, CARIBOU AND REINDEER.

Further investigations with respect to the caribou and musk-ox emphasized their probable future importance as factors in developing the far north of Canada. The question of preserving and utilizing the millions of caribou as a future meat supply was gone into, as was also the domestication of the musk-ox and the development of musk-ox herds both for food and fur purposes. It is claimed that musk-ox meat is quite as good as prime beef, while the wool, which is somewhat similar to buffalo wool, is well adapted for many kinds of manufactures. The physiological identity of the Barren Land caribou with domestic reindeer also appeared to indicate the possibility of successfully establishing a reindeer industry in the far north. The whole matter involved so many considerations and appeared to be of such importance to a future policy of development that the minister decided to appoint a Royal commission to investigate it. The commission expects to conclude its sittings in the near future and its report will no doubt form a valuable basis for a future policy with respect to the various questions involved.

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APPENDIX No. 1.

REPORT OF THE SUPERINTENDENT OF ROCKY MOUNTAINS PARK,
J. M. WARDLE, BANFF, ALBERTA.

As was expected the end of the war resulted in a large increase in the tourist traffic to the Rocky Mountains park, the season of 1919-20 being generally conceded the best Banff has yet experienced. This increase was largely due to the revival of tourist travel by rail. While the total numbers did not reach the figures of 1915—the year of the Pacific Coast exhibitions—it was noticeable that visitors tended to make a much longer stay in the parks than formerly. At Banff and Lake Louise an increasingly large number of people remained from one to two months. During July and August and a good part of September accommodation in the hotels and lodging-houses of the park was taxed to the limit.

Owing to the exceptionally dry summer motor traffic from the prairies showed no increase over the previous year, the number of outside cars visiting the park remaining about the same. About ten miles of road in the Morley Indian reserve were graded by the provincial government in July and August and as the weather was unusually dry, this road was very soft and dusty until the fall and this no doubt reduced the number of motorists to the park from Calgary.

The season throughout all the western provinces was a particularly trying one for all types of earth and gravel roads owing to the absolute lack of rain during the spring and early summer. The park roads were similarly taxed and a great deal of maintenance work was found necessary, week-end traffic being particularly destructive to the dry and dusty road surfaces. Despite the many difficulties experienced, all the park roads were kept in good condition. The few days' rain in August improved matters greatly and from that time to the end of the season the roads were in better condition than ever before. The difficulty of road maintenance in dry weather resulted in the decision to apply light road oil to the surface of sections of the main road in the park next season.

AUTOMOBILES.

While there was no increase in the number of cars entering the park as compared with last year, the motor traffic was large and, as usual, the officials registering the cars at the Entrance Arch were rushed during the week-ends.

The following is a summary of the licenses issued:—

One thousand nine hundred and seventy-eight transient licenses (1,181 from Calgary, 87 from Edmonton, and 710 from other points); 64 park residents auto licenses (including Government cars); 85 park auto livery licenses; 5 motor-cycle licenses (including free license for R.C.M.P.); 74 non-resident season auto licenses; 17 auto license transfers; 123 chauffeur licenses.

BANFF TOWNSITE.

Considerable improvement was effected in the streets of the town during the year. Several streets, including portions of Muskrat, Rabbit, Bear and Caribou streets, were graded or regraded and surfaced with gravel, a steam roller being used for consolidation purposes. The rock surface of Banff avenue, Caribou and Lynx streets was treated with 60 per cent liquid asphalt. This work was completed in June and gave very satisfactory results. It is hoped to re-coat these streets each year until a good

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wearing thickness of asphalt mat is obtained. The surface of Cave and Spray avenues and the Golf Links road was improved and repaired by scarifying and rerolling. The latter road was treated with 40 per cent road oil, and a portion of Cave avenue with 60 per cent oil. Spray avenue was given one coating of waste fuel oil with satisfactory results.

A much needed sewer main on Grizzly street, between Cariboo and Wolverine streets, was laid during the year, and both water and sewer services were extended to several private houses.

FIRE BRIGADE.

The fire brigade, which had suffered in personnel and efficiency during the war, showed considerable improvement by the fall of the year. Some very useful equipment was added to the fire hall, including new hose, fire hooks, gas masks, extension ladders and a life net.

LIGHTING AND TELEPHONE.

Owing to a lengthy general strike at the Bankhead Mines, Banff was without electric power in the daylight hours from May until September. This was a great inconvenience to the people of the town and to business houses. The experience was another argument in favour of the construction of a power plant by the department as soon as finances permit.

A very busy year was experienced by the telephone service, the volume of business handled taxing the system to its utmost. Late in the year authority was granted to have an expert survey made of the present telephone system and plans prepared for new and more up-to-date lines and exchange.

A complete report was made on the present and proposed systems, and steps have already been taken towards the early establishment of an enlarged system.

ANIMAL ENCLOSURES AND ZOO.

Increases were reported during the year in the number of moose, elk, yak, Rocky Mountain goat and sheep confined in the various paddocks. All the above animals are thriving in their roomy enclosures. Through the courtesy of the 31st Battalion, C.E.F., of Calgary, a Siberian pony was added to the other interesting animals at the buffalo park. This pony was captured by the Germans in one of the Mazurian lakes engagements, and was in turn taken from the Germans by the above battalion at Amiens in 1918. A noteworthy fact was the importation of 192 elk from Yellowstone National Park, U.S.A. Owing to the severe winter and lack of feed many elk in Yellowstone were dying of starvation, and an opportunity was afforded the Dominion Parks Branch of securing several hundreds of these splendid animals. The elk for the Rocky Mountains park were brought in by rail and liberated at Massive and Duthill.

ZOO.

Through the courtesy of Superintendent Pennefather, of the Royal Canadian Mounted Police, of Lethbridge, a swan was added to the collection of birds. A badger, beaver and mink were secured during the season and two baby porcupines were born in captivity.

The following animals are at present confined in the animal enclosures and zoo:—

Enclosures.—6 buffalo, 13 moose, 29 elk, 1 Persian sheep, 11 Angora goats, 22 Rocky Mountain sheep, 6 Rocky Mountain goats, 49 four-horned sheep, 17 yak, 1 Siberian pony.

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FISHING.

Experienced park anglers and others report that the fishing season of 1919 was an exceptionally good one in all park waters. The fishery inspector also reports that more game fish were taken this year than any other. On several occasions when conditions were favourable, fishing in the Bow river near the golf links was excellent, the limit of catch being taken in two or three hours with the fly. In May and June, fishing was very good at lake Minnewanka, a large trout weighing over twenty-six pounds being taken by the troll. The Dominion Fish Hatchery, under the direction of the Department of Naval Service, continued operations during the year. A summary of its work is given herewith:—

DISTRIBUTION FROM THE DOMINION FISH HATCHERY AT BANFF, ALTA., 1919.

	Atlantic Salmon Fry.	Cutthroat Trout Advanced Fry.	Rainbow Trout Advanced Fry.	Rainbow Trout Finger- lings.	Salmon Trout Fry.	Salmon Trout Finger- lings.
Boom lake.. . . . .	.....	10,000	.....	.....	.....	—
Bow river, at Sawback.. . . .	.....	13,395	.....	.....	.....	—
Forty-mile creek.. . . . .	.....	15,000	.....	6,575	.....	—
High river, Middle Fork.. . . .	.....	.....	50,000	.....	.....	—
Jumping Pond, near Cochrane.	.....	.....	50,000	.....	.....	—
Massive creek.. . . . .	.....	10,000	.....	.....	.....	—
Red Earth creek.. . . . .	.....	.....	.....	5,000	.....	—
Jasper park—						
Hibernia lake.. . . . .	.....	.....	.....	4,000	.....	—
Marjorie lake.. . . . .	.....	.....	.....	4,000	.....	—
Patricia lake .. . . . .	.....	.....	.....	2,000	.....	—
Pyramid lake .. . . . .	.....	.....	.....	.....	.....	5,000
Johnston lake.. . . . .	.....	.....	10,000	.....	.....	—
Lake McGregor.. . . . .	.....	.....	15,000	.....	.....	—
Lake Minnewanka	154,574	.....	.....	.....	185,000	701
Summit lake, near Revelstoke, B.C.. . . . .	.....	.....	20,000	.....	.....	—
	154,574	48,395	145,000	21,575	185,000	5,701
Total distribution..					560,245	

DISTRIBUTION OF FRY FROM THE DOMINION FISH HATCHERY AT SPRAY LAKES, ALTA., 1919.

	Cutthroat Trout Fry.
Spray lakes—	
Bay near hatchery..	10,541
Shallows along shore..	25,000
Small creek at head of lake..	35,000
	70,541

TIMBER AND GRAZING.

More dry timber permits were issued than in previous years, several parties being engaged in cutting out dry timber for mine props and firewood at Castle and in the vicinity of Banff.

Twenty-five permits were issued during the season covering approximately 308,378 lineal feet of dead timber. In addition cordwood cut in the park totalled as follows:—

For residents' use..	150½ cords.
For government use..	60 "

Eighty-one grazing permits were issued during the year, covering the grazing of 175 horses and 204 cows.

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ROADS AND BRIDGES.

Improvement work on the Banff-Castle road and the Banff-Kananaskis road was continued during the season. Several miles of the former road were gravelled and improvements in alignment and grades were made on the east road. Maintenance work required was very heavy and was carried on in addition to improvement work. On the Tunnel Mountain road a diversion of 1,700 feet was constructed around the "Corkscrew" drive so that this road could be thrown open to one-way motor traffic. With the building of this diversion one of the best drives in the vicinity of Banff is opened to motorists. Maintenance work was done on the other roads in the vicinity of Banff, including the Loop drive, Hot Springs road, and Sundance canyon road. Construction on the new road from Castle to Lake Louise was carried on by contract under direction of park highway engineers. Owing to a late start only a small portion of the road was built.

CANMORE TOWNSITE.

The road from Canmore townsite to the Canadian Pacific Railway station was gravelled, and minor repairs were made to the main street. One or two stretches of sidewalk were also repaired.

LICENSES AND BUILDING PERMITS.

The following licenses were issued in the Rocky Mountains park during the past year: 50 rowboat licenses, 3 motor-launch licenses, 1 steamboat license, 5 boatsman licenses, 24 guide licenses, 17 horse livery licenses, 19 driver licenses, 21 tea room licenses, 4 pool room licenses, 1 bowling alley license, 102 dog licenses, 32 peddler licenses, 3 gum machine licenses, 9 butcher licenses, 2 moving picture theatre licenses, 3 moving picture operators licenses, 2 tent circus licenses.

During the past year 59 building permits were issued in the park and the estimated cost of the work done amounted to \$32,250.

HEALTH.

During the busy season Banff and all other points in the park were particularly free from sickness and contagious diseases. The medical health officer reports that he has never seen a season more free from sickness.

GENERAL.

The Rocky Mountains park had more than the usual number of distinguished visitors during the season of 1919-20. First among these was H.R.H. the Prince of Wales, who stayed three days in the Rocky Mountains park, September 17, 18 and 19. Arriving in Banff on the morning of the 17th—a perfect day—His Royal Highness was welcomed at the station by the whole population of Banff and Bankhead and guards of honour of local War Veterans, Stoney Indians, and Mounted Police.

Accompanied by a mounted escort, the Prince was then motored to the buffalo park, where a formal address of welcome on behalf of the citizens of Banff and the officials of the Dominion Parks Branch was tendered by the superintendent of the park. After his reply to the address of welcome His Royal Highness was made a chief of the Stoney Indians by other chiefs of the tribe with the title of "Chief Morning Star."

The Stoney Indians, of whom there were about 200 present in full native costume, then staged a number of contests in honour of their new chief, including horse racing, broncho busting, foot racing and archery.

After the formal morning ceremony His Royal Highness spent the afternoon on the Government golf course. The following morning His Royal Highness also spent on the links, leaving by the Royal train for Lake Louise on the afternoon of September 18.

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On October 20 and 21 the Rocky Mountains Park was further honoured by the visit of the Duke of Devonshire, Governor General of Canada, accompanied by Her Grace the Duchess of Devonshire and Lady Dorothy Cavendish. The Vice-Regal party was taken in motor cars to Johnston canyon and Moraine Lake, and by special request conducted to the top of Sulphur mountain. The splendid view from the Observatory at the summit of the mountain was much appreciated and the members of the party declared themselves well repaid for the climb.

As usual, Banff was visited by numerous conventions and delegations during the summer months, among these being the Fire Chiefs' Convention, Druggists' Convention, Industrial Congress, and Associated Press Delegates.

Several touring parties also passed through the park, the chief among these being a party under the management of the "Brooklyn Eagle," of Brooklyn, N.Y.

This party, which also toured through all the national parks of the United States, voted on the parks they considered best—Rocky Mountains park of Canada heading the list, while the Banff Springs Hotel was considered the best hotel.

WINTER CARNIVAL.

The Banff Winter Carnival, which closed on the 14th January, was very successful. A record number of entries in the various competitions was received from outside points. The Banff ski-jump for men is stated to be the fourth best in America and the boys' ski-jump is the best in America. The longest jump made at Banff was 187 feet. On the boys' jump, a world's record of 114 feet 6 inches was made.

APPENDIX No. 1a.

VISITORS TO ROCKY MOUNTAINS PARK FROM APRIL 1, 1919 TO MARCH 31, 1920.

BANFF SPRINGS HOTEL, Banff, Alta., Season, 1919.		CHATEAU LAKE LOUISE, Lake Louise, Alta.	
Canada..	3,766	Canada..	2,146
Newfoundland..	2	Newfoundland..	1
United States..	6,368	United States..	9,799
Alaska..	3	Alaska..	4
West Indies..	8	West Indies..	33
Java..	4	Java..	5
South America..	1	Mexico and Central America..	2
England..	244	England..	285
Ireland..	1	France..	28
France..	13	Holland..	27
Holland..	10	Other European countries..	24
Other European countries..	27	Australia..	123
Australia..	154	New Zealand..	53
New Zealand..	57	China..	113
China..	97	India..	14
India..	31	Hawaii..	53
Hawaii..	17	Philippine Islands..	5
Philippine Islands..	12	Japan..	20
Japan..	31	Africa..	2
Unlocated..	123	Unlocated..	221
Conducted parties (otherwise unlocated) ..	208	Total, 1919..	12,960
Total, 1919..	11,177	Total, 1918..	4,454
Total, 1918..	6,364	Increase..	8,506
Increase..	4,813		

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HOT SPRINGS HOTEL, BANFF (Open all year).		KING EDWARD HOTEL, BANFF (Open all year).	
Canada.. . . .	521	Canada.. . . .	6,890
United States.. . . .	24	United States.. . . .	510
England.. . . .	1	England.. . . .	60
New South Wales.. . . .	1	Other countries.. . . .	300
Australia.. . . .	2		
New Zealand.. . . .	1	Total.. . . .	7,750
Total.. . . .	550		
HOMESTEAD HOTEL, BANFF (Open May 15 to September 28).		MOUNT ROYAL HOTEL, BANFF (Open from May 15).	
Canada.. . . .	2,126	Canada.. . . .	5,427
United States.. . . .	215	United States.. . . .	437
England.. . . .	12	England.. . . .	45
Australia.. . . .	4	Other countries.. . . .	341
New Zealand.. . . .	3		
France.. . . .	1	Total.. . . .	6,250
Total.. . . .	2,361		
SANITARIUM HOTEL (Open May 15 to September 15).		ALBERTA HOTEL (Open two months).	
Canada.. . . .	3,213	Approx. 3,500 persons.	
United States of America.. . . .	1,000	SUMMARY.	
Australia.. . . .	27	Banff Springs Hotel.. . . .	11,177
England.. . . .	17	Chateau Lake Louise.. . . .	12,960
France.. . . .	9	King Edward Hotel.. . . .	7,750
Japan.. . . .	12	Mount Royal Hotel.. . . .	6,250
China.. . . .	4	Sanitarium Hotel.. . . .	4,282
Total.. . . .	4,282	Alberta Hotel.. . . .	3,500
		Homestead Hotel.. . . .	2,361
		Hot Springs.. . . .	550
		Summer cottagers and campers.. . . .	6,000
		Motorists.. . . .	10,000
		Excursionists.. . . .	5,000
		Total.. . . .	69,830

APPENDIX No. 1b.

REPORT OF THE SECRETARY OF THE ALPINE CLUB OF CANADA, BANFF, ALTA.

The Alpine Club House at Banff was open to members and their friends during the entire summer season. In spite of the very high rates of travel the attendance was good and the average visit of some duration. Visitors from Europe as well as from Canada and the United States came for varying periods and the number of seekers for information was as large as ever.

Mount Norquay continued to prove the most attractive of the neighbouring climbs. Mount Edith was climbed by at least one lady member as well as by men as training for more arduous work to come later on.

The usual ascents of the mountains surrounding lake Louise were made by members, and Mr. Val. A. Fynn was indefatigable in hunting for new routes. Dr. and Mrs. Stone climbed Pinnacle in part by a new route.

First ascents were made in the country to the south by club members. Dr. J. W. A. Hickson made the first ascent of Mount Sir Douglas and Mr. Fynn of Mount King George. As soon as new country is mapped in the Canadian Rockies members

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of the Canadian club find their way to the peaks and the accounts of their expeditions, related with authority in the *Canadian Alpine Journal*, are read all over the world, and serve to create new interest and attract new visitors to Canada's national parks. In Glacier park, Mr. and Mrs. MacCarthy not only ascended but descended Mount Sir Donald by the northwest arête without a guide.

During the winter the club took much trouble in organizing its delegation to the Congress of Alpinism summoned to Monaco by the Club Alpin Francais. The mountaineers of Europe will learn much of the wonders Canada has to show. The club again presented a cup for competition at the Banff Winter Carnival. In pursuance of its declared policy of bringing the mountains of Canada before the notice of Canada and of the world at large, its director, as director of events, again lent powerful aid to the success of the meeting.

The visitors to the club house were drawn from the following:—Canada—British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, and Nova Scotia. United States—Connecticut, Indiana, Maryland, Massachusetts, New Jersey, New York and Pennsylvania.

APPENDIX No. 2.

ANNUAL REPORT OF THE SUPERINTENDENT OF YOHO AND GLACIER PARKS, E. N. RUSSELL, FIELD, B.C.

YOHO PARK.

In Yoho park during the past season the need of a large tourist hotel, which we have hitherto had, was much felt and the lack of one prevented many tourists and visitors from staying in the park. The Mount Stephen Hotel, which up to this year has been run as a first-class hotel under the able management of the Canadian Pacific Railway Company, was recently turned over to the management of the railway workers, who completely occupy this large building. This left us almost without accommodation for the travelling public in Field and made it necessary for all persons wishing to stop off, to drive out either to the Emerald Lake Chalet or to the Yoho Camp immediately upon arrival, and as the accommodation at both these places was fairly limited, many were disappointed who wished to stay over. In spite of this, however, the park was well patronized and our drives and trails were all well used.

The Alpine Club of Canada held their annual camp towards the end of July, the main camp being pitched in Yoho pass on the shores of Summit lake, with an outlying camp near the mouth of the Upper Yoho valley. The camp was called "Victory Camp" and the site chosen was that where the first camp of the club was held in 1906. Slightly over one hundred members attended, amongst whom were many members of the club recently returned from overseas. The camp next year which is to be held at mount Assiniboine will be called "Welcome Home Camp" in honour of the returned soldier members of the club who, it is hoped, will then all be able to attend.

For the first time motor-cars and vehicles were allowed to run on certain of the roads in Yoho and Glacier parks and a number of residents availed themselves of this privilege, and brought in cars both for their own use and for hire. All roads in the Yoho park were open for use with the exception of the upper portion of the Yoho road, which the department has decided to throw open next season. The work undertaken in the park during the past year was largely in the way of maintenance and repairs. Some new road construction work was contemplated, but owing to the extreme shortage of labour it was not deemed advisable to undertake this, as the

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greatest difficulty was experienced in securing even enough men for work of a more urgent nature. This labour shortage became more acute as the summer progressed, absolutely no local labour being available. The new work contemplated was the construction of a motor drive from Hector to the eastern boundary of the park, to form another link on the Field-Banff highway which is now nearing completion. The completion of this road will mean much to Yoho park, rendering all its beautiful scenery and drives accessible by motor to visitors from Alberta and other outside points. It is hoped that during the coming year we may be able to complete this highway.

No new trail work was undertaken but fairly extensive repairs were made on a number of existing trails. The Ottertail, McArthur, lake O'Hara, Burgess pass, Twin falls, Little Yoho and several others were given special attention by a small trail gang, while all the other trails were properly cleaned out by the wardens of the various districts.

In the fall of the year an exchange of land was completed between the Dominion Government and the Canadian Pacific Railway Company, whereby this department acquired a portion of the Canadian Pacific Railway block situated within the townsite of Field, in exchange for some bottom land to the west of the townsite. The portion taken over by the department will prove a most valuable addition to the townsite, and will fill a long-felt want for suitable building lots. A new roadway was at once constructed through this land connecting the townsite with the bridge crossing the Kickinghorse river, which is now the main road out of the town, the old railway crossing having been closed by order of the Board of Railway Commissioners.

On account of the unusual dryness of the season, the fire hazard was greater than has been the case for many years past, and the wardens were kept constantly on the alert. During the months of June and July particularly, fire alarms were very frequent, but due largely to the efficiency of the warden staff and to the thoroughness of the equipment supplied them, we were able to suppress all fires before they assumed large proportions. A total of eleven railway fires and six general fires was reported, and the largest area burned over by any single fire was thirty acres. Our fire pumping units were in constant use and were undoubtedly the means of saving many hundreds of dollars. With the fire engines on the job we could always be certain that a fire was completely out before leaving it, whereas without means of thoroughly soaking the ground, watchmen would have been necessary in some cases for long periods. For next season the department has approved the purchase of a power speeder for use on the railway track, which will greatly facilitate the prompt dispatch of fire-fighting equipment to the scene of any fires which may be situated in the vicinity of the railway. On the completion of the fire season, the warden staff, under the supervision of the chief warden, started to work on the construction of a number of cabins and stables in different parts of the park.

The policy of the department in retaining the services of the wardens during the winter months in this park is a new one, but now that it has once been started I feel sure that the result of this winter's work will show that the expenditure was well justified. The policy of making a warden's position permanent cannot be too highly recommended as other necessary work can always be undertaken during the winter months and an efficient staff cannot be organized or expected unless these positions are for the year round.

VISITORS.

During the summer we were honoured by a visit from His Royal Highness the Prince of Wales and staff, who spent a full day in the park, and by his democratic manner and winning personality captured the hearts of all who were privileged to meet him.

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GLACIER PARK.

The season in the Glacier park is now practically governed by the opening and closing dates of the Glacier Hotel, one of the oldest hotels belonging to the Canadian Pacific Railway Company's system. In the old days before the completion of the Connaught tunnel, when the main line passed by the doors of this hotel, the house was kept open the year round, but now that it has been side-tracked by the diversion of the main line, it is only open for a few months during the summer, when it is usually crowded to capacity. The year past proved no exception to the rule, and from the time the Glacier House opened on June 1, up to the end of the season, it was almost impossible to secure accommodation unless a reservation had been made beforehand.

ROADS AND TRAILS.

During the month of May our wardens were placed on duty and at once commenced the work of cleaning out the trails in their districts. The road from Glacier station to the hotel was also gone over and repaired as was the road to the Nakimu caves. Later in the season a start was made towards converting the abandoned railway grade between Glacier and Rogers pass into a carriage or motor drive. A little over 50 per cent of this work was completed when it had to be discontinued owing to the lack of labour. It is hoped that we may be able to complete this work early next year. It will prove a most popular drive. This section of the new driveway will be about three and a half miles to the summit of Rogers pass, which was the highest point in the Selkirk range on the old main line of the Canadian Pacific railway previous to the construction of the famous five-mile tunnel running through the heart of Mount MacDonald.

TELEPHONES.

The first telephone line to be constructed in this park by the Department was completed this season, a forest line being run from the warden's cabin at Glacier to the cabin of the caretaker at the Nakimu caves, a distance of about six miles. The last mile and a half of this line lies over a snow-slide-swept area, and it was not considered feasible to erect a permanent line over this portion. A permanent line was therefore constructed to the end of the timber where the snow-swept-area commenced and from this point connection was made with the caves by insulated military wire laid along the ground. This wire was taken up again in the fall, one warden easily re-winding the one and a half miles in half a day. It will be relaid again each spring, thus eliminating all chance of loss or destruction to material by slides. The line worked most satisfactorily and was a great convenience both to the caretaker at the caves and to the travelling public.

VISITORS.

The number of persons visiting the Nakimu caves showed a considerable increase over the last two years, the registrations being nearly double that of the previous year.

Registrations at Glacier House were more than four times greater than in 1918. The total for 1919 was 2,238 visitors as against 521 in 1918.

APPENDIX No. 2a.**THE ALPINE CLUB OF CANADA.****CAMP IN YOHO PASS.**

The Fourteenth Annual Camp of the Alpine Club of Canada was held in Yoho pass on the shore of the lake from July 22 to August 5. It was felt that after the long years of war no more appropriate place could be chosen from which fresh inspiration could be drawn than the site where the very first camp of the club was held in 1906.

The camp was rendered of exceptional interest by the presence of soldier members who had greatly distinguished themselves during the war. The attendance was larger than at any camp since the fateful one of 1914 and vital interest was maintained until the end.

In the midst of a very dry summer the camp experienced a spell of broken weather, rendering plans difficult of execution at any definite date. The sunshine was appreciated and the afternoon thunderstorms accepted with equanimity.

In 1906 the climbs of the Vice-President were made by a most interesting route from Yoho pass but in the intervening years the glacier had shrunk and conditions entirely altered. Though some climbs were made by this route it was found advisable to lead the novice up from the Little Yoho, either by the rocks or by the snow.

Other peaks ascended, several more than once, were President, Des Poilu (formerly Habel), Marpole, Kerr, Michael's Peak, Burgess, Wapta and Field.

In addition to the easy ordinary route, Mount Wapta was twice climbed on the northeastern face without a guide, a most interesting and worthy climb.

The large Yoho glacier was found to be shrinking rapidly, the ice cave no longer existed and the face of the snout was exceedingly steep.

The annual meeting discussed among other matters, the erection of some form of memorial of the members of the club who had served in the war. It was suggested that a hut be built at some point suitable for a climbing base.

The Swiss guides lent to the club by the Canadian Pacific Railway were Edward Feuz and Christian Hasler. Their services were untiring and greatly appreciated.

There were present members of the English, Swiss and American Alpine Clubs, the B. C. Mountaineering Club, Appalachian Mountain Club, Colorado Mountain Club, the Mazamas, the Sierra Club, and the Royal Geographical Society.

APPENDIX No. 3.**REPORT OF THE ACTING SUPERINTENDENT OF REVELSTOKE PARK,
E. N. RUSSELL, FIELD, B.C.**

The principal work done at Revelstoke park during the year was the continuation of the motor road to the summit of Mount Revelstoke. It was hoped to complete this road during the season but owing to the great difficulty of obtaining labour and the early onset of winter this was not possible. The new work completed this year was as follows: Fully completed road, from station 643 to station 648. Stumping, grubbing and burning from station 643 to 663. Partly cleared from station 663 to 714. Seven culverts completed between stations 643 and 663. All cribbing completed up to station 661.

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The auto road was well patronized by the many motorists of Revelstoke, as well as by many visitors to the district, amongst whom was His Royal Highness the Prince of Wales and Party, who included this drive in his itinerary while on his tour of Western Canada. Fourteen cars in all started with the Royal party, but unfortunately three of these were unable to make the full trip, owing to engine or other trouble. On reaching the end of the road as at present constructed at station 635, a stop was made, and His Royal Highness with a few suitable words kindly unveiled a memorial tablet dedicating the Revelstoke National park for the use and enjoyment of the Canadian people. This tablet was set in concrete on the top of a huge granite boulder to the right of the roadway in a prominent position on a switchback turn of the road overlooking the Illecillewaet valley. Light refreshments were then served by some of the ladies of Revelstoke, after which the party returned to the special train awaiting them, His Royal Highness and a number of others walking the whole of the return journey down the trail.

A new cabin for the use of the warden was constructed near the summit of mount Revelstoke, on the shores of Balsam lake, together with a small stable. It is the intention to extend our telephone line to this cabin in the near future, thus insuring prompt communication with the town of Revelstoke, which will be of great service in cases of forest fires, or other emergencies. Only one fire occurred this year which was easily suppressed, being caught in its early stages, and entailing an expenditure of only \$16.

The Mount Revelstoke trail was thoroughly gone over and repaired by the park warden assisted by some outside help, but extensive repairs will have to be undertaken next season on that portion of this trail between Balsam lake and lakes Eva and Miller, as the corduroy work has about served its time and is becoming very rotten. It is hoped next season to construct a new trail from the western boundary of the park to the summit of mount Revelstoke, and thus open up a large portion of the park now inaccessible. The proposed new trail would start at a point near Twelve-mile creek on the Big Bend road, thence running in a westerly direction passing the Surprise lakes, Butte lake, and Caribou lake and from there along the summit of the mountain to lakes Eva and Miller. This proposed trail will pass through some magnificent scenery.

In the fall of the year some improvements were undertaken on the ski grounds. This is now probably without exception, the finest ski-jumping hill on the American continent and attracts the finest jumpers in the world to the annual contest held under the auspices of the Revelstoke Ski Club. The Canadian amateur record is held by a Revelstoke man, who this year surpassed his own former record jump of 177 feet by making a standing jump of 185 feet on this hill. Several jumps of over 200 feet were made by professionals, the world's champion jumper making one jump of 212 feet, which is within one foot of his record jump. Winter sports in the Revelstoke park are fast forging ahead, and in a very short time have assumed a prominent position in this respect. Thousands of visitors now come to witness the annual tournament.

It is anticipated that the boundary lines of this park, which at present are not definitely settled, will be shortly adjusted. The matter of finally deciding upon the area which is to be included within the park is a most important one, and I trust that the department will not allow another season to pass without clearly defining it. I would recommend that when a decision has been reached, a proper survey of these lines be made, and the lines cut out for a width of at least six feet, in order that they may be clearly marked. This I believe would be necessary on account of the difference between the park regulations and the laws governing the lands surrounding the park.

APPENDIX No. 4.

REPORT OF THE SUPERINTENDENT OF JASPER PARK, COL. S.
MAYNARD ROGERS, JASPER, ALTA.

The game resources of Jasper park are increasing steadily year by year. It is estimated that there are now in the park at least 5,000 Rocky Mountain sheep (bighorn) and the increase has brought about the beneficial result that the surplus is gradually moving outside of park boundaries thus furnishing to the legitimate sportsman good shooting in the areas adjoining.

From reports received from our warden service and from outside sources it is estimated that outside of park areas on the eastern slopes alone, from the forks of the McLeod to the Southesk river in the southeast corner of the park, there were approximately 2,000 bighorn last fall. Parties shooting there were able to get in most cases the full complement allowed by law and in every case splendid heads were procured without any difficulty.

Mrs. Mead, of Chicago, and her 16-year-old son procured their four heads in the first twenty-four hours, one especially large head over 18 inches among the number.

To the north of the park near the Snake Indian river, Miss Foster, her brother and a friend procured with their guides, 10 splendid sheep, 7 goat, and Mr. Foster also shot a very fine caribou. This all goes to prove that the protection afforded by our warden service has been satisfactory.

ROCKY MOUNTAIN GOAT.

These magnificent but very timid animals are also increasing enormously and the overflow will soon afford good sport to the legitimate hunter.

MOOSE.

Moose are increasing rapidly on our easterly foothills and an old moose or two is usually to be found in the Rocky river, the Jack lake and Pyramid lake areas as well as on Signal mountain.

Mule deer, white-tailed and black-tailed deer are also increasing satisfactorily but not as rapidly as could be wished, principally owing to the numbers of large coyotes or "brush wolves," as they are locally termed.

BEAR—GRIZZLY, BLACK AND CINNAMON.

Bears are increasing rapidly, and the time will soon come when we shall have to take steps to lessen their numbers as they are getting very bold.

WAPITI OR ELK.

A small band of these interesting and beautiful animals is to be found in the Southesk country where they have taken refuge from the depredations of Indians and breeds residing outside the park limits. They are being carefully safeguarded so far as our small warden service will permit. During the year 100, of these stately animals were procured from Yellowstone National park, Wyoming. This shipment, in spite of being nearly seven days on the train, suffered a loss of only 11 which is considered to be a very good record, especially in view of the fact that nearly 50 per cent were fully grown.

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FUR-BEARING ANIMALS—BEAVER, MARTEN, MINK, ETC.

These valuable animals continue to thrive and are increasingly numerous.

BIRD LIFE.

There does not appear to be any great increase of bird life in the park, which may partly be accounted for by the depredations of coyotes, wolves and lynx which have had to look to this source for food supply in the absence of rabbits now reappearing after their usual seventh year diminution.

We were very much encouraged by the settling down and breeding in Jasper park of about fifty wild geese during the past season, the first time on record since 1912. In every case they raised young and appeared to realize that they were safe from mankind as they became quite tame towards the end of the season.

FISH.

Fish appear to be increasing satisfactorily and new lakes are being continually opened up which add to our fairly long list of good fishing waters. The sound policy of restocking lakes, which has been consistently followed, will undoubtedly have a very material effect within the next few years.

PREDATORY ANIMALS.

The wardens are steadily decreasing predatory animals such as wolves, coyotes and lynx by energetic measures of shooting and trapping, but owing to the lack of rabbits, migratory bands of wolves and coyotes continue to come into the park area in search of food supply.

In a recent long winter trip through the mount Robson area returning by the Snake Indian river, one of our wardens saw numerous wolverine tracks. All possible steps will be taken to eradicate this dangerous predatory animal.

VISITORS.

Jasper park was honoured by many distinguished visitors during 1919; first by the premier visit of a Vice-Regal party, including His Excellency the Governor General, accompanied by Her Grace the Duchess of Devonshire, Lady Dorothy Cavendish, Miss Egerton, Miss Saunders, Captain McMillan and Captains Cator and Lord Haddington, A.D.C.

Their Excellencies spent three days in the park climbing and visiting several of the beautiful outlying districts. They expressed great pleasure in their visit, particularly enjoying the Maligne canyon. The party climbed to the top of Whistler mountain and nearly to the top of Muhegan, approximately 9,000 feet in altitude. They also visited Pyramid lake and lakes Patricia, Beau Vert, Edith, Annette and others, and were kind enough to express the hope of returning for a more prolonged stay during 1920.

We were also honoured by visits from several parties of distinguished scientists, viz., Major H. Chapman, Secretary-Treasurer of the United States Alpine Club, accompanied by Dr. Howard Palmer and Mr. Carpe, who spent some weeks in exploring the Tonquin valley and the Fraser icefields. They carried out a considerable amount of topographical and photographic work which will be immensely valuable to the park.

Dr. Chamberlin, of the Department of Geology, University of Chicago, also spent some weeks exploring the Pyramid mountain and mount Edith Cavell regions. Dr. Chamberlin and his confrère succeeded in climbing mount Edith Cavell, a feat that

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has only been accomplished once before. They were able to carry out this most difficult task with comparative ease by discovering a new and much easier route than the ones so often tried in the past which defeated many mountain climbers with international records, such as A. L. Mumm and others.

The following extract from a letter from Dr. Chamberlin gives his impression of the district:—

“Mount Cavell was our finest day's work. Specializing in that phase of geology which deals with the structure of mountain ranges, I have, under the pretext of professional necessity, climbed mountains on all the continents except Africa and Antarctica, but I can recall only two other days among several score of these mountain ascents which gave such complete satisfaction as that spent on mount Cavell. We both of us marvelled at the exquisite beauty of the mountains to the south. It would take too long to state just wherein the charm lies, but it impressed me as one of the grandest parts of the North American continent. It is certainly to be hoped that some time in the near future trails will be opened up so that visitors can, without too great labour, get up into the midst of that wild and rugged country.”

TOURIST ACCOMMODATION.

The park was crowded beyond capacity of accommodation all through the past season, and the want of a suitable and modern hotel is a serious handicap. The “Tent City,” with accommodation for sixty guests, were compelled to put out the “no accommodation” sign nearly every train day.

UNITED STATES EDITORIAL ASSOCIATION.

On Sunday, the 3rd of August, the United States Editorial Association were entertained to a buffalo barbecue and luncheon at Lac Beau Vert, and the 239 members apparently thoroughly enjoyed the unique entertainment provided, as well as the interesting scenic features in the vicinity of Jasper, including Maligne canyon and the beautiful chain of lakes between Jasper and the canyon, which they were able to explore in the short time at their disposal.

FOREST FIRES.

The season of 1919 proved a most unfortunate one, with regard to forest fires, of which we had an unusually large number. The majority, fortunately, were small in area and were checked in time to prevent spreading. One serious fire started in British Columbia between Yellowhead and Lucerne. This fire covered approximately an area of 10 square miles, but fortunately the loss in timber was not very large from a commercial standpoint, although it sadly marred the scenic features from Yellowhead east almost to Mount Edith Cavell station.

The only other large fire was in the Rocky River district opposite the mouth of Jack creek. This fire was evidently caused by the carelessness of tourists or fishermen. With the exception of this Rocky river fire, the remainder were all set by locomotives, which unfortunately were obliged, owing to war conditions, to revert to coal-burning instead of oil-burning engines as in previous years. It is not likely that we will escape a large number of railway-set fires until oil-burning engines are re-established.

ROAD CONSTRUCTION.

Owing to the difficulty in obtaining labour, the only new road construction carried out was a small portion of the Edith Cavell road, which was done by contract. It is hoped that the coming season will see the completion of this road to lake Edith Cavell, one of the most interesting scenic points in Jasper park.

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The same applied to our trail construction, but it is hoped that during the coming season there will be no difficulty in securing ample labour for our different park requirements.

TRAILS.

New trail construction was carried out between Athabaska falls and Sunwapta cabin, the start of a permanent trail to the source of the Athabaska via Brazeau lake, which when constructed, will be very popular with the tourists who wish to take the long and most interesting trip from Jasper to Banff or vice versa.

At Brazeau lake the trail branches off to the eastward and it is hoped the construction will be completed this year of the permanent round trip trail from Sunwapta to Brazeau lake, thence to the Southesk country and back to the Rocky river over the Osborne pass to the Jack lake trail. This is one of the most urgently required trails for proper fire and game protection in this park and in addition, it will make an ideal round trip for tourists.

CABINS.

It is expected to construct this coming year four new cabins at points of interest in Jasper park to augment the ones at present erected and which have proved very popular with tourists in the park. These cabins are utilized by the wardens when required and they also provide accommodation for tourists on their trips through the park.

TELEPHONE LINES.

Our park telephone system is at a stage when a complete reinstallation of telephone poles is absolutely necessary, as the main trunk line from Yellowhead to Errington is the old Foley, Welch and Stewart construction line installed many years ago.

MIETTE HOT SPRINGS.

These wonderful curative springs were very largely patronized, principally by the miners from Pocahontas, Brulé mines and Bedson, and many cures of rheumatic affections were reported. There is as yet no accommodation at the springs but we expect to construct a suitable shelter this year.

PERMANENT BRIDGE OVER ATHABASKA RIVER AT JASPER.

A small work gang of returned soldiers has been steadily employed for the past few months in putting in heavy concrete abutments and doing the necessary rock excavation on the east bank preparatory to the installing of a much needed steel bridge at this point, the only means of access at high water from Jasper headquarters to the south and east portions of the park.

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APPENDIX No. 5.

REPORT OF THE SUPERINTENDENT OF WATERTON LAKES PARK,
GEORGE A. BEVAN, WATERTON PARK, ALTA.

On June 23, 1919, I assumed the duties of superintendent relieving Mr. F. E. Maunder, Superintendent of Revelstoke park and late acting superintendent here.

The tourist traffic during the past season was very gratifying. During the latter part of June and throughout the months of July and August, the summer cottages were all occupied and the camping grounds were in constant demand.

WATERTON TOWNSITE.

As all the desirable building lots for cottage purposes in the townsite had been leased, it was necessary to plot a new subdivision. This work was undertaken by E. S. Martindale, D.L.S., of Ottawa, and 80 new lots were laid out by him in a most desirable situation along the base of the mountain. The interest taken by the public was very gratifying and as soon as these lots are made available for application, fifty per cent will be applied for and built on without delay, more inquiries than this having already been received.

The streets and avenues of this new subdivision have been cut out and cleared and are now ready for stumping and grading. This work will be undertaken in the early spring.

OFFICIAL BUILDINGS.

A new office 20 by 20 with a storeroom 16 by 16 was erected by the department. This was attractively built of peeled logs and finished inside with beaver board. A superintendent's residence was also completed of the same type as the above.

ROADS.

Owing to the need of strict economy consequent upon war expenses, very little was undertaken in the way of new roads. One new road was laid out by the highway engineer's division from the north boundary of the park to Waterton bridge, a distance of nearly two miles. Owing to the early arrival of winter, one-half of this work only was finished; the balance will be completed this coming year.

TRAILS.

No new trail work was undertaken, the existing trails being kept in good condition by the warden service.

I regret the lack of good saddle trails in the vicinity of the lake for the convenience of the tourists, and would recommend that the trail laid out by Mr. J. M. Wardle in 1917, connecting Akamina pass trail with the boundary trail via Cameron lake, be included in the plan of work for the season of 1920.

TELEPHONES.

The main line was extended from the old office to the new building, a distance of approximately $1\frac{1}{4}$ miles and an extension line built to the warden's cabin on Pass creek,

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approximately 2½ miles. All the wardens' stations in the park proper are now in direct telephone communication with headquarters, but connections will have to be built in the future to outlying cabins for fire emergencies.

The department has entered into contract with the Provincial Government to build a toll line connecting Waterton park with Pincher Creek during the next season. This connection has long been desired.

GRAZING.

Permits were granted during the season for 2,916 head of horses and cattle. These grazing privileges are much appreciated by the local stockmen and many more permits could have been granted had we been able to accommodate them.

FIRE PROTECTION.

The season of 1919 was excessively dry and forest fires in the West were very prevalent and disastrous. Eight broke out in this park. Of the first six we received early notice and were able to put them out without much trouble or expense. The two latest fires, viz., those at Oil City and Belly river respectively, occurred at the end of the summer, when fierce winds were blowing, and owing to the fact that we did not receive early notice they gained unusual headway and considerable damage resulted. The chief warden and his staff are to be congratulated upon the manner in which they fought and controlled these fires.

Two small pumping units were received during the season, which will be of great assistance to our fire fighting equipment in the future. These are so constructed that they are easily portable either by man power or by automobile. Unfortunately, the necessary equipment for these units was not here at the time of the above-mentioned fires.

GAME.

That the preservation of the game has been very satisfactory is proved by the large numbers of game which are from year to year becoming tamer and are more frequently visible to the tourists. There have been no violations of the game regulations during the season.

RECREATION.

Boating and fishing are among the most popular attractions with visitors to this park.

There are three motor launches and twenty-nine rowboats licensed for hire during the season, besides several other row and motor boats belonging to private individuals. The fishing is very good and many individuals obtained their limit during the season. Several trout weighing between twenty and thirty pounds were taken from the lake.

VISITORS.

During the season a marked increase was shown in the number of tourists from the United States Glacier National park, who visited this park by automobile and pack-horses. It is reported that many others would have come had they been able to secure means of transportation. On July 26 the Alberta Automobile League made a tour from Lethbridge, staying here for two days. By arrangement with head office, sixty tents were provided and pitched for their accommodation.

The total number of visitors to the park for the year 1919 was approximately 9,000.

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APPENDIX No. 6.

REPORT OF THE SUPERINTENDENT OF BUFFALO PARK, A. G. SMITH,
WAINWRIGHT, ALTA.

FARMING OPERATIONS.

An experiment of growing rape along with the oats was tried out this year, the object being not only for after-pasture, but particularly for the benefit to the land where it is impossible to have a proper rotation of crops. In all about 440 acres were sown, 410 acres at the south end and 30 acres at the north end. The rape grew exceedingly well, and had the season been a normal one, the experiment would have been very satisfactory, but owing to the drought the oats were short and light with the result that the rape leaves gave us some trouble when cutting with the binders. However, the rape leaves in the straw made splendid feed for the Buffalo and the stubble made good pasture for the horses running out all winter.

About 75 acres of our crop were stacked for green-feed and from the balance we threshed 6,300 bushels of oats, which was, in view of the nature of the season, considered a fair crop. Early in the summer some 200 acres, off which two crops had been taken, were summer-fallowed and put in shape for the next spring.

HAYING.

The hay on the Ribstone meadow was light but the quality was good and we succeeded in securing about 400 tons. We also stacked about 130 tons of upland hay in the main park to be fed to the animals in the home paddock and the cattalo enclosure.

In addition to the hay cut in the park for our own requirements we also granted permits to settlers covering the cutting of 500 tons, and as the permits were granted on the basis of one ton per head of stock and not more than 20 tons to any one farmer, we were in this way able to divide up the available hay among a large number of farmers, and I can assure you it was of much assistance to them.

GRAZING LEASES.

During the year those sections of the reserve outside the main fence on both the east and west sides of the park were leased for a period of one year, and a considerable revenue was thereby received.

FIRE GUARDING.

All work in connection with the ploughing and discing of fire guards was done by our own teams. There were no fires in the park during the year.

TIMBER PERMITS.

A large number of the settlers again took the opportunity of procuring dry wood in the park. Permits for 500 cords were taken out and as a permit for twenty-five cords costs only twenty-five cents, the benefit the farmers derive from this privilege is of no small importance.

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Permits were also granted to bona fide farmers for the cutting of willow fence pickets along the banks of Battle river and Ribstone creek. This is the first year we have granted permits for fence pickets and the privilege has been much appreciated as permits covering 9,500 fence pickets were taken out during the past winter.

HORSES.

There were 42 head of horses shipped to this park from Kingston, Ont., in December to be wintered here. Altogether we have now about 100 head, including colts. I consider we have been very fortunate with our horses as there has been no loss.

WILD ANIMALS.

All the wild animals have done well throughout the year. The natural increase in buffalo, 1,148, has gone beyond all expectations. The elk also showed a good increase, adding 27 to their number. The moose, deer and antelope also show an increase.

The decrease in buffalo for the year was 40. Of this number 21 were slaughtered and 20 found dead. The number of wild animals now in the park is as follows:—Buffalo, 4,668; elk, 124; mule deer (estimated), 431; moose, 24; antelope, 4; cattalo, 15; yak, 4; domestic cattle, 15; total, 5,285.

The yak were brought in from Banff during the year, and they, along with the domestic stock and cattalo, are kept in separate pens of the Cattalo Enclosure where the experiment of cross-breeding is being carried out. A rather interesting incident in connection with this experiment was the raising of a buffalo calf along with a domestic calf by a domestic cow. Both calves thrived very well and although the buffalo calf was taken off the cow last fall it still follows its foster-mother at every opportunity.

The winter just ending has been a very long one with the deep snow and considerable crust. About 2,000 buffalo, mostly bulls, were left out in the main park during the winter to rustle their feed, as it was not considered advisable to have the whole herd in winter quarters. Early in March, about the time we usually turn the herd out of winter quarters on to the summer range, we had to bring about 800 of those that were left out into winter quarters to be fed, and haul feed out into the big park for those still out, but I am pleased to report the herd being brought safely through one of the hardest winters known in Western Canada, and in good condition.

WILD BIRDS.

Wild geese and ducks appeared to be more plentiful this year than at any previous time; in fact birds of many kinds seem to realize the protection that awaits them inside the park boundaries and it would now appear as though each year we will see more of the wild bird life.

COYOTES.

The hunting of coyotes with dogs has been constantly kept up, the number killed this year being 52, and it can be noticed that these noxious animals are not nearly so plentiful as they were a few years ago.

VISITORS.

Each year brings many new visitors to Buffalo park. The number entering by the Wainwright entrance for the year was 6,330; another 1,000 visited the park entering by the other gates and all expressed the greatest interest and pleasure in seeing such a wonderful herd of wild animals.

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APPENDIX No. 7.

REPORT OF THE SUPERINTENDENT OF ELK ISLAND PARK,
ARCHIBALD COXFORD, LAMONT, ALBERTA.

We started haying operations the first of August and put up about 280 tons which, with about 40 tons carried over from the previous year, gave us sufficient for the winter feed. The hay meadow at Goose Lake was enclosed with a three-strand barbed wire fence. This will prevent the numerous cattle that range on the forest reserve from roaming over the meadow.

VISITORS.

We had a few campers during the summer and a large number of visitors who generally spent the day picnicking, boating and bathing. Different organizations come here for their annual picnic and these find the lack of a sports ground a great drawback. I think grounds fit for ball games, etc., should be attended to at once, considering the demand there is for one and the small expense it would entail. The visitors for the year numbered 3,922.

ANIMALS.

The percentage of increase in the buffalo is not so large this year as the previous year. We find with all the animals increasing each year we are crowded for ample pasture and I would strongly recommend extending the boundary of the park at least six miles south into the Cooking Lake Forest Reserve. The buffalo have come through this severe winter in excellent shape. The rider has seen more animals this winter than usual; he reports the deer and moose in fine shape and the elk fair.

The total number of animals in the park is as follows: Buffalo, 198; moose, 63; elk (estimated), 150; deer, 125.

APPENDIX No. 8.

REPORT OF THE SUPERINTENDENT OF POINT PELEE PARK, F. H.
CONOVER, LEAMINGTON, ONT.

Point Pelee has long been a household word throughout western Ontario, not only on account of its scenic attractiveness, its novel and shady driveways, but because of its charming and unique character which distinguishes it from every other area in Canada. It is, as is well known, the most southerly point in the Dominion, and as a result it possesses both a fauna and flora of peculiar interest to the scientist and nature lover. Its abundant and semi-tropical vegetation includes many species not found elsewhere in this country and it is the only spot within the northern range of many southerly breeding birds. It is also in the direct path of one of the great routes of migration and its extensive marshes and dense undergrowth form an ideal resting place for many forms of bird life in migration as well as a breeding place throughout the season.

It is a matter for much congratulation that through the public-spirited efforts of local societies and the authorities concerned with the conservation of wild life at Ottawa, this unique area has been permanently set aside. While early conditions of soil and forest have to some extent disappeared it still retains a wealth of plant and animal life which makes it, as I have said, one of the most interesting places in Canada.

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EROSION BY STORMS.

During the past season heavy storms considerably damaged the shore line, resulting in extensive erosions along the eastern shore of the point. Numerous large trees, several of them three feet in diameter, and many red cedars were uprooted and swept out into the lake by the strong currents. The present frail shore line was once an extensive deposit of massive gravel beds, but unfortunately a great part of these had been removed for commercial purposes before the reservation of the area.

IMPROVEMENTS.

The general attractiveness of the park has been heightened by the removal of driveway debris and decayed undergrowth. It was also found necessary from time to time to clear away the flotsam and wreckage left behind by severe storms.

To provide the public with drinking water two drive wells were sunk with gratifying results. These have been covered with attractive arbours and several purple martin houses, built according to departmental specifications, erected. A number of martins very soon took up their abode in these and it is hoped they will return during the coming season, bringing others with them.

WILD LIFE.

While the park has only been established for a comparatively short period, it shows already gratifying results as a wild life sanctuary. It affords a perfect environment for quail (bob white) as well as for the English ringneck pheasant. The extensive runs and subways throughout, interlaced with a profusion of creeping vines, mammoth weed growth and wild rose, ensure excellent protection against heavy snows throughout the winter as well as covert from predaceous birds and animals.

In 1918 the warden constructed several artificial brush shelters. These were stocked with grain and served as resorts for the birds during the severe storms. A similar provision will be made for the ensuing winter.

It is noted that the quail have increased to over 100 since the inception of the park. This is most encouraging and indicates that we will soon have large numbers of these birds under the existing methods of protection.

A large variety of song birds annually visit Point Pelee in migration and numerous species nest here. The marshes with their wild grass, bullrushes and cane reeds afford nesting grounds for many game and other birds, but unfortunately those bird homes are frequently destroyed by marsh fires. At the time of writing thousands of deserted nests, somewhat similar in formation to that of the oriole, are visible, suspended in the flags. During the past season marsh fires also destroyed the natural covert of mallards, teal and wood ducks.

The banning of September shooting in Point Pelee park by federal enactment has undoubtedly stimulated the increase of many forms of wild life. Last September large numbers of teal and some wood ducks, which were apparently on their southern migration, took shelter in the park during this month. They were followed later by members of the dwindling remnants of the ruddy ducks, by the black ducks, the mallard and the less artful red head.

The perceptible increase in many kinds of bird life during migration last year, including rice birds, jack snipe, shore waders, wild ducks and geese, would seem to indicate that the Migratory Birds Convention Act is already beginning to bear good results.

The production of wild rice as food for the shoal feeders and of wild celery for the deep water birds, Canvasback, Red Head, and American Scaup which is now being

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undertaken should materially assist in increasing the numbers of waterfowl. In this connection the maintenance of normal water levels not only for wild fowl alone but also for muskrat is of great importance. Unless the fresh water inlets are kept open stagnation ensues with a resulting decrease or destruction of the plant life which serves as food for both.

The destruction caused by carp in the waters is widely evident. These destroy the sustenance that rightfully belongs to the waterfowl. The efforts now being undertaken at your suggestion will, it is hoped, soon put an end to these pests.

Point Pelee marsh also provides an ideal habitat for the muskrat. At the close of 1919 it was estimated that there were 2,000 dwellings with approximately six inhabitants in each or a total of 12,000 muskrats in the park, independent of bank and bog habitations. At prevailing prices for skins this makes Point Pelee a valuable fur producing area.

One hundred and thirty-four permits were issued for shooting in the open season for ducks, October 1 to December 14, inclusive.

Motor traffic to the park was greater than during any previous season and it is hoped that expenditure will be authorized during the coming year for the speedy completion of necessary roadways and for the accommodation of automobiles, especially near the south end of the Point. There were over five hundred cars in one day within the parking zone, not including those in the central portions of the park.

APPENDIX No. 9.

THE ST. LAWRENCE ISLANDS PARKS.

An important addition was made to these parks during the year by the purchase of what was formerly known as Doran's or Sheep island, directly opposite the town of Morrisburg. This island was originally part of the St. Regis Indian Reserve but had been leased by the Indians for a term of years to a private individual. At the expiration of the lease in October, 1916, the Department of the Interior acquired it from the Department of Indian Affairs and by Order in Council dated December 3, 1919, it was proclaimed a Dominion park. The island has been named Broder park in memory of the late Andrew Broder, who for many years represented Dundas in the House of Commons. It is one of the finest of the island reservations, covering about twenty acres, well wooded and possessing a good bathing beach as well as suitable grounds for baseball and other sports. Several campstoves encased in cement, tables, benches and other conveniences necessary for the comfort of picknickers and campers have been provided. It was not possible to construct a pavilion in time for the season, but a large tent 24 x 48 has been erected to serve as a protection to visitors against rain or storm.

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APPENDIX No. 10.

REPORT OF THE HONORARY SUPERINTENDENT OF FORT ANNE
PARK, L. M. FORTIER, ANNAPOLIS ROYAL, N.S.

The year just ended has been one of steady progress at Fort Anne. The museum has gone on growing in extent and interest, and the recent repairs to the administration building (the old officers' quarters in the fort, built by the Duke of Kent in 1798) have made it possible to effect a much better arrangement of the exhibits, so that they can now be seen to proper advantage by visitors. Something over 3,000 persons visited Fort Anne during the year, of whom 2,181 registered their names and were given personal attention.

NATIONAL PARKS AND RESERVES.

ADMINISTERED BY THE DOMINION PARKS BRANCH, DEPARTMENT OF THE INTERIOR.

Name.	Location.	Date of Es- tablishment.	Area.	Special Features.
Rocky Mountains park.	Alberta, east slope of Rockies..	1885	2,751 square miles.	Ideal mountain playground containing the two famous resorts, Banff and Lake Louise, with much of finest scenery of east slope of Central Rockies. Massive formation of stratified sedimentary rock, upper slopes bare, worn and castellated, or glacier crowned, lower slopes covered with luxuriant forests and flower carpeted alplands. Glacier-fed lakes of exquisite colouring, wild deer, goat, sheep, elk, etc. Recreations: alpine climbing, walking tours, riding, boating, swimming, golf, tennis and motoring, winter sports—ski-ing, tobogganning, ski-joring, snow-shoeing, skating, etc.
Yoho park.	British Columbia, west slope of Rockies.	1886	476 square miles.	Rugged scenery of west slope of Rockies, narrow transverse valley of Kickinghorse, precipitous peaks, large number with permanent ice caps or glaciers, wonderful Yoho valley with falls over 1,200 feet in height. Four great snowfields at head. Natural bridge, Emerald lake, lakes O'Hara and McArthur.
Glacier park.	British Columbia, summit of Selkirks.	1886	468 square miles.	More massive formation of older range. Peaks worn down almost to timber line crowned with innumerable glaciers; luxuriant forests, alpine flower gardens. One of the best centres for alpine climbers and students of glacier formations, Illecillewaet and Asulkan valleys and glaciers, Nakimu caves, Marion lake, Rogers and Baloo passes.
Revelstoke park.	British Columbia.	1914	95 square miles.	Fourteen-mile motor drive up Mt. Revelstoke affording panoramic views of Columbia and Illecillewaet valleys, Clach-na-Coodin ice-field, lakes Eva and Millar. Winter sports resort, game preserve.
Kootenay park.	British Columbia.	1920	587 square miles.	Highway park extending 5 miles on each side of new Vermilion-Sinclair section of Banff-California highway. Passes through wonderful and practically unknown mountain scenery. Historic rivers, towering canyons, Briscoe range, Ice lake, Sinclair canyon and Radium Hot Springs. Bear, deer, caribou and sheep.
Jasper park.	Northern Alberta.	1907	4,400 square miles.	Immense mountain wilderness, partly unexplored, rich in historic associations. Numbers of unclimbed peaks, glaciers, snow fields, canyons, innumerable lakes of wonderful colouring. Athabaska valley, Maligne lake, gorge and canyon, Mt. Edith Cavell, Miette Hot Springs, Mt. Robson, highest known peak in Canada. Largest big game sanctuary in world.
Waterton Lakes.	Southern Alberta, adjoining U.S. Glacier Park.	1895	423 square miles.	Mountains noted for beauty of colouring; lovely lakes, waterfalls and snow-peaks, excellent trout fishing, favourite camping resort.

St. Lawrence Islands.....	Ontario.....	1905	140 acres.....	Thirteen islands and one mainland reservation among the Thousand Islands of the St. Lawrence river equipped for the use of summer campers and visitors.
Broder park	Ontario.....	1919	4 acres	Additional island opposite Morrisburg recently added to above reservation.

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ANIMAL PARKS AND RESERVES.					nn
Buffalo park.....	Near Wainwright, Alberta.....	1907	158.75 square miles	Fenced enclosure, home of the Government's great buffalo herd—5,000 buffalo, also moose, elk, deer, yak and cattalo.	
Elk Island.....	Near Lamont, Alberta.....	1899	16 square miles.	Smaller fenced enclosure contains about 200 buffalo, also moose, elk and deer.	
Foremost Antelope reserve.	Southern Alberta.....	Reserved by Order of Minister.	9 square miles.	Fenced reserve containing about 100 antelope.	

HISTORIC PARKS.

Fort Howe.....	New Brunswick.....	1914	19 acres	Associated with earliest history of province. Site of landing of U.E. Loyalists.
Fort Anne.....	Nova Scotia.....	1917		Fort Annapolis Royal played important part in early history of Canada, first vessel constructed and first grist-mill erected in North America, the centre of civilization and progress in Acadia and of the fiercely contested struggle between France and England for the possession of the continents.
Port Pelly Park reserve.	Saskatchewan.....	Reserved by Order of Minister.	14 secs.....	One of the early Hudson Bay Company's posts; first seat of government of Northwest territories and headquarters of Royal Northwest Mounted Police.
Pt. Pelee.	Ontario, on lake Erie.	29th May, 1918		Most southerly point in Canada; northern limit of many migratory birds; summer resort and bird reserve; unique fauna and flora.

PART III

FORESTRY

REPORT OF THE DIRECTOR OF FORESTRY, R. H. CAMPBELL

This report covers the work of the Forestry Branch for the fiscal year 1919-20, ended March 31, 1920.

The past year was remarkable as including the most disastrous season for forest fires since the establishment of the Forestry Branch. All through the West there was very little snow in the winter, and when it disappeared the early spring brought an abnormal period of drought and continuous high winds. Later in the summer conditions improved in Manitoba and Saskatchewan, but in Alberta and British Columbia the weather continued very dry and the situation caused great anxiety all through the summer. Even the strenuous exertions of the field staff could not prevent fires getting away, and heavy damage to the forests resulted in some localities.

While the revenues received from the forests are yet small as compared with the amount required for their protection and management, still they are increasing steadily. The total revenue for the last fiscal year was \$127,975, as compared with \$23,445 in 1913-14. Between these years receipts from the different sources increased as follows: Timber from \$18,867 to \$70,229, grazing from \$221 to \$42,248, and hay from \$773 to \$9,592. With such a marked increase in revenue it would seem that we are justified in expecting that the forests will in time make financial returns commensurate with those secured in Europe. In France the expenditure on state forests is \$3,000,000, or \$1 per acre, and the revenue is \$4,800,000, or \$1.60 per acre. In Hesse there is a net revenue over expenses of \$5.32 per acre, and in Saxony an expenditure of \$3.33 per acre brings in receipts amounting to \$6.35 per acre. In Switzerland the net annual returns range from \$3 per acre in the forests where least is expended to \$8 per acre where most is expended.

The British Government has continued its interest in the forests of the Empire and has arranged an Empire timber exhibit and an Empire forestry conference to be held in London, England, during July, 1920. The timber exhibit for Canada was collected and arranged by the staff of the Forest Products Laboratories of Canada, and one of the members of the staff will go to London to look after the exhibit. It is expected that the Dominion Government will be represented by an official of the Forestry Branch. Other Canadian foresters will also attend, representing the provincial governments and various organizations. It is hoped that the result of the conference will be, not only the establishment of a permanent imperial timber exhibit and of a system of collecting information in regard to the forests of the Empire, but also the organization of an imperial forest commission or committee which will keep up both of these and will assist the development of the forests and proper scientific forest management throughout the Empire.

At the request of the Forestry Commission for the British Isles the work of securing tree seed of Pacific Coast species was again undertaken. It was found impossible this year to obtain the seed of Douglas fir as the crop was a complete failure. The Sitka spruce, however, bore heavily, and 600 sacks of cones were collected along Masset inlet on the Queen Charlotte islands in what was the centre of

the airplane spruce industry during the war. A temporary kiln and extracting plant were erected at Port Clements and a yield of about 1,000 pounds of seed was obtained. Seven hundred pounds of this seed were shipped to the Forestry Commission and the remainder sold to the Belgian Government.

The forest ranger school for returned soldiers organized by the Department of Soldiers' Civil Re-establishment was continued at Vancouver, British Columbia, and the course considerably extended. Some of the teaching was given by foresters on the staff of this branch. Graduates of the school, who were employed as forest and fire rangers, gave satisfactory service on the whole.

The usual methods for interesting the public in the forests and their protection have been continued. These include illustrated lectures, talks to schools, and distribution of literature to school children and to homes near to or in the forest. By the co-operation of the Publicity Branch of the Department of Trade and Commerce moving pictures have been taken of fires and fire-fighting and also of tree-planting, so that hereafter Canadian moving picture theatres, lecturers, and educational institutions will not have to depend on pictures of such scenes from other countries. It is hoped that the showing of these films throughout Canada will give Canadians some idea of the fact that their own country is in the van of progress.

STAFF

The total permanent staff of the branch for the last year was as follows:—

Head office..	40
District inspectors	5
Assistant district inspectors..	4
Forest supervisors..	17
Forest assistants..	12
Forest rangers..	99
Chief fire rangers..	9
Inspectors of tree-planting..	8
Forest Products Laboratories, technical staff..	20
Outside clerical staff..	40
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APPROPRIATION

The appropriation for the year was \$850,000. The expenditure was divided as follows:—

Salaries at head office..	20,510 62
Salaries of officials on military leave..	1,520 09
Travelling expenses..	3,034 19
Printing and stationery..	6,240 56
Miscellaneous expenses..	2,910 87
Fire-ranging..	232,042 18
Forest reserves..	458,878 79
Tree-planting	61,781 65
Forest Products Laboratories..	61,055 29
War appropriation..	1,505 59
	<hr/>
Total..	\$849,479 83

NOTE.—The item of \$1,505.59 shown under War appropriation was drawn from the Forestry appropriation and later refunded.

The field expenditure, exclusive of tree-planting on prairie farms, is divided as follows among the provinces:—

Manitoba..	\$ 96,443 52
Saskatchewan..	185,524 34
Alberta..	247,773 19
British Columbia (Railway Belt)..	161,179 92
	<hr/>
Total..	\$690,920 97

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LIBRARY

During the year 306 books and pamphlets were added to the library and indexed in the card catalogue. The number of magazines regularly received in the library was 104. Of these 43 were subscribed for in the regular way, the remainder having come from different government agencies or from societies with which the branch maintains an exchange of publications.

The number of photographs received was much smaller than in previous years, chiefly owing to the fact that very little survey work was carried on during the year. The collection of lantern slides has received a large accession, the two most important additions being some eighty slides to illustrate French forestry methods, made from photographs sent in by an officer of the branch, and two hundred slides of individual trees illustrating the tree flora of southwestern Ontario, the chief hardwood region of Canada.

PUBLICATIONS

The intensive study of all printing, publishing, and publicity work of the Forestry Branch to get the best results with the lowest possible expenditure of money was continued during the year. In addition to the Annual Report only two bulletins were issued for circulation during the fiscal year, No. 66, "Utilization of Waste Sulphite Liquor," and No. 68, "Forest Fires in Canada, 1917," but the manuscripts for several important publications were in course of preparation. During the year the practice of making a charge for expensive and technical publications, which has long been followed in Great Britain and the United States, was inaugurated by the department at the suggestion of the Editorial Committee. The object of making a nominal charge for a bulletin is not to make money but to prevent waste through persons (particularly children) applying for documents in which they have no interest. The new plan has worked most successfully. The Forestry Branch has in daily use about three hundred different printed forms, and the work of standardizing these forms, and combining two forms where possible, has been continued, and has resulted in considerable saving in cost of printing. The experimental tests to produce the ideal forest fire poster are resulting in the establishment of certain principles, which will be a guide in future work. It is believed that the posters prepared for the season of 1920 are the best yet sent out, and that further improvements can be made in future years. The newspapers throughout Canada are now seized of the great importance of forest conservation and have given more attention to this subject than in any previous year.

STATISTICS

The Forestry Branch continued to co-operate with the Dominion Bureau of Statistics in the collection, compilation, and publication of forest products statistics. The forestry statistician of this branch revised the schedules received from manufacturers of lumber, lath, shingles, and pulpwood, and checked and edited the bulletins published by the Bureau of Statistics in connection with forest products. Articles were prepared for trade magazines on forest statistics and a detailed description of the methods used in Canada in collecting forest statistics was prepared for the International Institute of Agriculture, Rome, Italy.

The work of collecting and compiling information concerning Canada's forest resources and forestry development in Canada was undertaken with the object of putting this information into printed form for distribution at the Empire forestry conference in London.

TREE-PLANTING

The spring of 1919 in the Prairie Provinces was late and cool and therefore favourable for getting up and distributing nursery stock; but the cool weather

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continued well into the month of June, which delayed growth. As summer came on the weather became hot, dry and windy and the conditions for growth were generally poor. As a consequence, although the stock was shipped out in good condition, the growth of new plantations was far from satisfactory and even the old tree plantations suffered considerably, particularly where cultivation of the ground was not well done. None of the older plantations were completely wiped out but the percentage of loss was much higher than usual.

The number of farmers to whom stock was shipped was 4,501, and the number of seedlings and cutting distributed to them was 4,377,950, making an average of about 970 for each applicant. The stock available for distribution in the spring of 1920 is 3,266,850, and there are 1,801 new applications for trees. With weather and labour conditions so unsatisfactory this is a good showing. Coniferous trees to the number of 186,000 were distributed to farmers and there is a stock of 180,000 available for 1920.

The collection of tree seed for starting stock on the forest nursery is a matter which always requires great care and foresight. The dry weather of last year and other unfavourable conditions made the collection of a sufficient supply of good seed difficult, but sufficient was obtained to enable the nurseries to carry on at about the usual scale.

FIRES

In Manitoba the light snowfall of last winter (1918-19) was gone early in April, and was immediately followed by dry, windy weather. In addition, the water in lakes, streams, and muskegs was lower than ever known before. In early May bad fires broke out on the eastern boundary of the Porcupine forest reserve, apparently caused by settlers, trappers, and locomotives. These fires burned over a great deal of logged-over land and the "slash" had an important effect on the way the fires spread. On the other Manitoba reserves practically no serious fires occurred.

This dangerous fire condition extended westward into Saskatchewan and later into Alberta and British Columbia. During the latter part of May and the early part of June extensive fires raged throughout northern Saskatchewan and did great damage both within the forest reserves and outside of them. Eventually, these fires ran together and swept north through timbered country. Undoubtedly, the origin of these fires was due in large part to the unregulated use of fire by settlers in clearing their land. Although the province of Saskatchewan has excellent provisions in its Prairie and Forest Fires Act for the control of settlers' fires, our rangers have not yet been given sufficient authority under the Act to enable them to take full advantage of its provisions. The largest fire in Saskatchewan occurred in the Battleford fire-ranging district. It started on June 16, and was not extinguished until July 18, burning over an area of 2,740,000 acres.

In Alberta the early spring conditions were slightly better but by the end of May the fire situation throughout southern Alberta had become extremely serious, and early in June two serious fires occurred on the Crowsnest forest. The largest fires in Alberta, however, occurred a little later on the Bow River forest, both caused by camp-fires. Over \$20,000 was expended in fighting these two fires which burned over 1,450,000 acres.

Conditions in the Railway Belt in British Columbia were very critical during July and August. About 90,000 acres were burned over, the most serious losses being in the Salmon Arm district, where a number of the largest fires were started by dry electrical storms.

It may be noted that in the states of Montana and Idaho the losses from forest fires in 1919 were among the most serious ever experienced in that region. The cost of fighting fires during June, July, and August in those states was over two and a half million dollars.

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The total number of fires both inside and outside the forest reserves was 1,313. The total area burned over was 5,491,215 acres, of which 1,556,462 acres carried merchantable timber, 1,429,005 acres bore young growth, and the remainder was grass land, brule not restocking, muskeg, and "slash." The causes of these fires are given in the following table, together with a comparison of the percentage due to each cause in each of the last three years:—

Cause	Number of fires, 1919	Percentage—		
		1919	1918	1917
Unknown..	341	26	27	32
Campers and travellers..	152	11	14	18
Settlers..	238	18	23	22
Railways..	418	32	23	17
Lightning..	57	4	5	4
Lumbering..	27	2	2	3
Incendiary..	22	2	2	2
Brush disposal (other than by settlers)..	23	2	2	1
Other known causes..	35	3	2	1
Total..	1,313	100	100	100

FOREST RESERVES

The forest reserves comprise an area of approximately 27,500,000 acres, and consist of tracts of land unsuitable for agriculture which have been set apart permanently for forest production. At the request of the Soldier Settlement Board areas totalling about 480,000 acres were withdrawn from the reserves in order to be made available for soldier settlement. For the most part these areas consist of small tracts of a few hundred acres, withdrawn from a number of different reserves. Only in the cases of the Riding Mountain and Porcupine reserves were the areas larger, about 220,000 acres being withdrawn from the former and about 240,000 acres from the latter. The permanent staff employed on the reserves during the year was: District inspectors, 4; assistant inspectors, 4; forest supervisors, 17; forest assistants, 12; forest rangers, 99; a total of 136. The temporary staff of rangers on the reserves numbered 61.

Improvements.—Owing to the dangerous fire season and the necessity for careful watching for and fighting fire, neither men nor money could be spared for an extensive programme of improvements. The following improvements were, however, carried out:—

Class of Improvements—		Total cost.	Average cost.
Cabins..	Number, 5	\$ 2,472	\$ 495
Houses..	" 3	6,875	2,292
Stables..	" 4	2,449	612
Other buildings..	" 5	1,261	252
Lookout towers..	" 1	250	250
Telephone lines..	Miles, 44	5,054	115
Fireguards ploughed..	" 27	217	8
" cleared..	" 4	222	55
Roads..	" 4	2,078	520
Trails..	" 18	686	38
Miscellaneous projects, such as fences, etc..		711	—
Total..		\$22,275	

Timber operations.—Owing to the growing cost of fuel and increasing consumption of lumber the demands upon the forest reserves for fuel-wood and timber have also increased. Special efforts were made to dispose of fire-killed timber on those reserves on which areas have been swept by fire. The advantage of this policy is threefold; (1) it conserves the growing green timber for later use, (2) it removes a serious fire

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menace created by these areas of dry trees, and (3) it clears up the ground and permits natural restocking to begin at once. The matter of the disposal of débris is steadily becoming more satisfactory. The regulations require the burning of the brush under proper safeguards, while the timber cutting is proceeding, so that the fire danger from this most important source may be removed. In the beginning of this work, some years ago, the settlers and other permittees showed decided reluctance to undertaking the extra labour thus required, but now that they are becoming seized of the necessity of this work to protect timber for themselves and other settlers they are showing increasing willingness to comply with the regulations. The total number of timber permits issued was 4,362, which is an increase over the preceding year which was one of the heaviest since the Forestry Branch was established. The quantity of saw-timber cut under these permits was over twelve million feet board measure, which was nearly double the cut of the preceding year. Increases were also recorded in the case of mine timber and fuel-wood.

Fires.—There were 220 fires in the forest reserves as compared with 116 in 1918. One hundred and fifty of these fires, 68 per cent, burned over more than ten acres each. The total area burned over was 1,600,916 acres, of which 418,641 acres were covered with merchantable timber, 499,161 acres with young growth, and the remainder was divided among grass land, old “burn” not restocking, “slash” and muskeg.

A statement of the number of fires on forest reserves in 1919 and their causes is given below with a comparison of the percentage due to each cause in each of the last three years:—

Cause	Number of fires, 1919	1919	Percentage—	
			1918	1917
Unknown.. . . .	79	36	40	31
Campers and travellers	30	14	20	21
Settlers.. . . .	26	12	13	18
Railways.. . . .	46	21	11	14
Lightning	9	4	3	5
Lumbering.. . . .	12	5	4	3
Incendiary.. . . .	6	3	6	4
Brush disposal (other than by settlers).. . . .	5	2	3	1
Other known causes.. . . .	7	3	—	3
	220	100	100	100

Planting on Forest Reserves.—As usual the greater proportion of the trees used for planting on the forest reserves was supplied from the forest nurseries at Indian Head, Sask. Forest nurseries are, however, gradually being established on the larger forest reserves where planting will be necessary. A total of about eighty-five thousand young trees was set out on six reserves. The reserves and the species planted thereon were as follows: Spruce Woods, jack pine; Dundurn, jack pine, Scotch pine, and spruce; Manito, spruce and jack pine; Elbow, jack pine and Scotch pine; Pasquia, spruce and Scotch pine; the Pines, spruce, jack pine, and Scotch pine. Generally speaking the young trees were got into the ground under satisfactory conditions. These are sample plots and, along with those previously set out, are being studied closely in order to determine the best methods for future planting.

GRAZING

The number of grazing permits issued during the year was 1,653 and the total number of stock grazed was 99,361. This represents an increase in the number of permits issued of 481, or 40 per cent over last year and 220 per cent over the previous year. The increase in the number of stock grazed was 12 756 head, or 15 per cent over last year and 256 per cent over the previous year. These figures do not take into consideration the cattle grazing on forest reserves in the Railway Belt, the grazing regulations not having been applied to British Columbia as yet.

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The increase thus shown indicates that the grazing resources of the forest reserves are being appreciated by the settlers on adjoining lands, who, because of the forage thus made available are adding stock-raising to their other enterprises. A further evidence of the increasing appreciation of the reserves and the policy adopted in the administration of the grazing resources is the readiness of the settlers to group themselves into grazing or stock associations in order to secure the benefits of co-operative management and the privilege of consulting with the forest officers relative to the administration of the range in which they are interested. There are now forty-three such associations which have received official recognition, many of them having been organized during the past two years. Five of these associations are in Manitoba, eleven in Alberta and twenty-seven in Saskatchewan.

The shortage of feed during the past two seasons in most sections of the West, and the consequent demand made upon the forage resources of forest reserves, have rendered it necessary to ascertain the maximum carrying capacity of the various grazing districts in the reserves, not only to the end that the greatest number of stock may be accommodated, but also in order that the reserves may not be over-grazed and the ranges injured in consequence. Expert reconnaissances have therefore been made on several of the reserves. Maps showing the location and density of the various forage types and detailed plans of management have been prepared in each case, and it has already been found possible as a result to accommodate considerably more stock than was feasible under the haphazard system of grazing management previously followed by the settlers and ranchers. It has been demonstrated that if the forest reserves are to meet the increasing demand being made upon them for grazing it can only be done by the adoption of a scientific system of range management based upon exact information as to the various types of forage existing on each range, and such other information as will assist in the proper handling of the stock. This is work requiring special training and experience, and can therefore be proceeded with only as such expert assistance is made available.

RECREATIONAL USES

Summer Resorts.—The forest reserves are steadily coming into more general use for recreative purposes. Each year shows an increase in the number of cottages erected at the various summer resorts. Camping and picnicking parties find healthful pleasure on the shores of the various lakes, and those resorts which are accessible by automobile are visited by considerable numbers each week-end and holiday during the season. There are many locations throughout the forest reserves which, while not sufficiently large to permit of establishing summer resorts, offer very desirable building sites for a limited number of cottages, with a measure of privacy not obtained in the larger summer resort areas. For this reason they are considered more desirable by many persons, and it has been decided to make such sites available under annual (renewable) permits by laying them out into building lots, from time to time, as the demand becomes apparent. In such cases the permittees are required to erect satisfactory buildings within a year, as is the case in the larger summer resorts.

Fishing.—Angling is, of course, indulged in at most of the summer resorts and it is found that good fishing invariably increases the attraction of such places. Non-residents of the province are required to take out fishing permits at a special fee, and the sum thus realized helps to meet the cost of the protection and supervision of the fisheries. It is the policy of this branch to prevent netting in these lakes and streams and to permit fishing by angling only, and by this means, together with adequate supervision and occasional restocking where feasible, so to improve the fishing that non-resident visitors will be attracted, as undoubtedly the money spent by these visitors in the course of their outing amounts to considerable in the aggregate. By the co-operation of the Dominion fisheries authorities and the General Passenger

Agent of the Canadian National Railways, a shipment of 250,000 pickerel fry was recently planted in lake Madge in the Duck Mountain forest reserve. These fry were brought from the Dominion hatchery at Gull Harbour via Selkirk and Winnipeg, a somewhat arduous undertaking. They were distributed in good condition, however, and the prospects for successful results are excellent.

Game.—The provincial authorities have always realized to a greater or less extent the value of the forest reserves as game sanctuaries. The natural conditions on the reserves favour the increase of game and fur-bearing animals when adequate protection is afforded, and the fact that the reserves are divided into districts, in charge of forest rangers who are interested in the protection of all the resources of the forests, has the tendency to reduce the activities of the poacher to a minimum. The forest officers, while not assuming primary responsibility for the protection of game, a matter which properly belongs to the province, co-operate fully with the provincial authorities and in some cases are constituted provincial game wardens in order that such co-operation may be more effectively carried out.

An important instance of the increasing appreciation on the part of the provincial authorities of the value of the forest reserves as game sanctuaries is found in recent amendments to the Alberta Game Act. By one of these amendments it has been made necessary to obtain a special permit before any fur-bearing animal may be trapped or otherwise taken on a forest reserve. By another amendment the Cooking Lake forest reserve and that part of the Cypress Hills forest reserve which is in Alberta have been declared game preserves, and it is further provided that any game preserve established by the Dominion Government shall be a game preserve within the meaning of the Alberta Game Act. This last provision is considered important as it provides a means whereby any portion of a forest reserve possessing the necessary features of a game refuge may be brought within the scope of the above Act, should it be so desired.

FIRE-RANGING OUTSIDE FOREST RESERVES

The dangerous fire season of 1919 strained to the utmost the energies of the fire-ranging staff in the districts outside forest reserves and made clear, what has been known all along to those in charge, that in a dangerous season the patrols of each fire ranger are too extensive for safety and that a much larger regular staff is urgently required. The number of chief fire rangers employed was 11; the number of fire rangers and assistants temporarily employed was 207. The number of fires which occurred was 1,093. The total area burned over was 3,890,299 acres, of which 1,137,821 acres carried merchantable timber, 929,844 acres bore young growth, and the remainder was grass land, old brule not restocking, muskeg, and “slash.”

Hereunder is a statement of the number of fires outside the reserves in 1919 and their causes, together with a comparison of the percentage due to each cause in each of the last three years:—

Cause	Number of fires	Percentages—		
		1919	1918	1917
Unknown..	262	24	26	32
Campers and travellers.. . . .	122	11	14	18
Settlers..	212	20	24	23
Railways	372	34	25	17
Lightning..	48	4	5	4
Lumbering..	15	1	2	3
Incendiary..	16	1	1	2
Brush disposal (other than by settlers..	18	2	1	1
Other known causes..	28	3	2	—
	1,093	100	100	100

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PETAWAWA FOREST EXPERIMENTAL STATION

During the year the survey of this tract was completed and the data concerning the different sections were tabulated and maps drawn for information and guidance in future operations. The completion of the survey confirms the opinion early formed that this tract is in every way suitable for a forest experimental station wherein to study how reproduction of desirable species may best be promoted in a country that has been logged-over, and where the logging has frequently been followed by fire. The reserve is typical of the great extent of cut-over timber lands in Ontario and Quebec. In the area sixteen sample plots of varying size have been surveyed and their borders marked. These include pure and mixed stands of white pine, red pine, jack pine, and different broad-leaved trees. Some plots have been thinned to determine the rate of reproduction under these conditions, while others have been cleared of débris and left unthinned to show the rate of reproduction under natural conditions. The trees in these plots have been numbered (the numbers being stencilled on the bark) and measured, and the records so tabulated that their rate of growth can be determined readily by measuring them again at regular periods. The work of measuring typical trees in order to secure data upon which to base growth tables and yield tables was also proceeded with during the year. It is interesting to note also that the series of form factors for trees worked out by Professor Tor Jonson, of Sweden, were found to be approximately correct for Canadian species, so far as measurements were carried out.

FOREST INVESTIGATIONS

While in all districts where there are technically trained foresters located there are observations being made and investigations of a more or less detailed character being carried on, the organized scientific work in these directions has been mainly centred at the forest experimental station at Petawawa, Ont., as outlined in the preceding paragraph, and at the forest nursery station at Indian Head, Sask. At Indian Head a large number of plantations of small area, in some cases of single species and in other cases of various mixtures, have been in existence for some years. Careful records have been kept from year to year of the growth and development of the trees and there is being steadily accumulated a store of information that will be of the greatest value in future planting work on farms or in the forests. The conifers, when once well established, show satisfactory results.

FOREST PRODUCTS LABORATORIES

While hampered by difficulties caused by post-war conditions referred to in last year's report, principally by the loss of officers who have gone to other organizations, every effort has been made to continue the work of the Forest Products Laboratories efficiently. The work of testing forest products for the purpose of aiding Canadian industry is varied, and reference is here made only to the more important lines of investigation. These during the fiscal year included studies of decay in pulpwood, deterioration of pulp, decay of timber in buildings, problems in manufacturing newsprint paper, Nova Scotia mine timbers, factors entering into the durability of railway ties, the use of Canadian red pine for paving blocks, and the utilization of overmature aspen. The laboratories are making studies of all Canadian commercial timbers, with the object of giving architects, engineers, and builders complete information as to their mechanical and physical properties. The timber already dealt with is Douglas fir and the timber under investigation during the year was Sitka spruce. This latter wood has come into great prominence in the last few years because of its use in airplane construction.

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The work in regard to railway ties covers the handling of the tie from the woods to the track, with the object of finding how best to increase its durability. This has involved a field survey of railway ties and the securing of the co-operation of railway officials. The investigation is already leading to important results.

The preparing of exhibits of wood products for use at exhibitions in Canada and abroad received considerable attention. There is a real demand for this work, which tends to extend the use of Canadian products both at home and overseas.

Proof of the value of the laboratories to the business and manufacturing interests of Canada is shown in the steadily increasing number of inquiries received relating to timber and forest products, and the problems of their manufacture. The number and character of these requests for accurate information is one of the many indications of the need of broadening the scope of the work of the laboratories.

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TABLE 1—Statement of Revenue, Forestry Branch, Fiscal Year ended March 31, 1920

Reserve	Timber sales		Timber fees and dues		Timber seizures		Grazing permits and trespasses		Hay permits and seizures		Surface rentals		Special uses		Nursery stock		Unclassified		Total	
	\$	cts	\$	cts	\$	cts	\$	cts	\$	cts	\$	cts	\$	cts	\$	cts	\$	cts	\$	cts
Turtle Mountain.....			227 70				2,115 30		497 50		35 00		32 00						3,207 50	
Spruce Woods.....			12 75		16 76		991 65		155 50		50 00								1,926 66	
Riding Mountain.....			16,672 67		791 40		2,058 61		1,381 95		510 60		353 95				682 30		22,450 78	
Duck Mountain.....			5,742 41		194 20		679 07		531 00		210 00		131 00						7,487 70	
Moose Mountain.....			566 07		20 50		1,025 97		1,470 85		95 00		0 75						3,178 40	
Beaver Hills.....			78 75		14 00		392 70		957 00				4 50						1,446 95	
Porcupine.....	1,100 16		5,032 80		151 98		347 50		1,083 90				121 00						7,837 37	
Pasquia.....	4,907 39		4,697 50		462 80		30 15		182 50				25 75						10,306 08	
Fort à la Corne.....	355 19		834 95				91 80		58 75										1,340 09	
Pines.....			1,156 22		12 00		428 05		72 70				9 25						1,678 22	
Nisbet.....			1,391 35		1 00		44 05		182 25				13 50						1,632 15	
Big River.....			444 95				189 07		598 25				11 00						1,246 25	
Steep Creek.....			30 25				63 95												93 50	
Sturgeon.....			19 20				100 50		61 75				10 61						192 08	
Keppel.....			410 00				511 00		73 75				7 50						1,032 25	
Manito.....			132 75				1,196 00		126 75				15 25						1,470 73	
Dundurn.....			19 25				305 80		80 30				4 25						409 60	
Seward.....							424 60		96 00				24 00						544 60	
Elbow.....					15 00		605 80		85 75		118 50		17 75						842 20	
Big 5 tie.....							5,614 07						55 00						5,649 05	
Cypress Hills.....			913 70		32 15		6,231 92		91 25		35 00		0 95						7,301 09	
Cooking Lake.....			19 35		54 00		781 60		398 05		49 25								1,302 50	
Crowsnest.....	2,161 40		2,540 41		55 55		10,784 30		25 00				301 85				15 00		15,886 57	
Bow River.....			748 81				6,653 31		51 25				336 55						7,819 95	
Clearwater.....	4,162 70		917 06		221 60		105 75		93 25		257 54		140 85						5,898 77	
Brazeeau.....	2,802 08		1,182 53		76 80		41 80				569 56		130 00						4,802 77	
Athabaska.....	3,168 01		0 50				117 00		11 25				72 25				5 00		3,374 03	
Lesser Slave.....	2,238 25		1 00		53 00		19 01		110 00				3 00						2,424 26	
British Columbia Reserves.....	3,216 87		119 05						86 00		91 72		72 00						3,585 64	
Indian Head Nursery.....															1,581 00		7 23 69	2,304 69		
Total.....	24,114 98		43,942 11		2,172 76		42,247 79		8,592 05		2,022 19		1,876 11		1,581 00		1,425 99		127,975 43	

TABLE 2--Statement of Timber Permits Issued, Fiscal Year ended March 31, 1920

Reserve	No. of permits		Kinds and quantities of timber authorized to be cut									
	Free	Paid	Poles or rails	Fence posts	Saw timber	Railway cross-ties	Mine timber	Building logs	Fuel, green	Fuel dry	Dues and fees	
			No.	No.	Ft. B.M.	No.	Lin. Ft.	Lin. Ft.	Cords.	Cords.	\$ cts.	
Turtle Mountain.....	41	40		4,200	97,500			2,750		1,320	227 70	
Spruce Woods.....	29	1								407	12 75	
Riding Mountain.....	243	1,016	600	32,547	5,533,069			35,752	325	4,516	16,672 67	
Duck Mountain.....	184	316	1,500	20,773	1,882,171	1,000		16,888		4,710	5,742 41	
Moose Mountain.....	3	156	650	19,670	10,580			7,390	271	609	566 05	
Beaver Hills.....	117	13	200	700	6,763			8,560		1,587	78 75	
Porcupine.....	81	73	8,200	9,232	2,772,989			24,494		227	5,032 80	
Pasquia.....	22	93	11,200	135,318	195,112	4,820		24,092		7,930	4,697 56	
Fort à la Corne.....	87	102	15,875	15,906	272,533	3,000		59,086	10	1,633	834 95	
Pines.....	43	133	5,435	12,420	1,820			33,129	25	3,394	1,156 22	
Nisbet.....	153	150	31,000	18,325	4,480			234,748		6,405	1,391 35	
Big River.....	11	22	2,600	13,550				12,926		1,165	444 95	
Steep Creek.....	11	7	200	1,300	3,000			500		250	30 25	
Sturgeon.....	5	4	3,000	1,000				7,384		25	19 22	
Keppel.....	39	148	650	1,175	6,000			8,500	459	557	440 00	
Manito.....	63	61	4,158	11,440				3,000	187	984	132 73	
Dundurn.....	2	9							46	45	19 25	
Cypress Hills.....	172	296	76,853	52,570	7,970		500	51,510	546	2,581	913 76	
Cooking Lake.....	13	3		500				2,864		335	19 35	
Crowsnest.....	108	98	10,379	12,004	1,133,028		204,612	159,829	19	1,745	2,540 41	
Bow River.....	26	51	11,850	4,595	292,260			47,914		600	748 84	
Clearwater.....	57	14	4,800	1,000	2,000		34,000	137,231		1,417	917 06	
Brazeau.....	3	14				2,350	302,680	32,906		75	1,182 53	
Athabaska.....	2									50	0 50	
Lesser Slave.....	4							3,000		45	1 00	
British Columbia Reserves.....	9	14	5,520	1,495	6,000			4,185		260	119 05	
Total.....	1,528	2,834	194,670	369,720	12,227,275	11,170	541,792	918,638	1,888	42,872	43,942 11	

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TABLE 3—Statement of Grazing Permits issued on Forest Reserves, Fiscal Year ended March 31, 1920

Reserve	No. of Permits	Number of Stock				Dues and fees collected
		Cattle	Horses	Sheep	Total	
						\$ cts
Turtle Mountain.....	138	2,277	389		2,666	2,415 30
Spruce Woods.....	49	911	63	327	1,301	991 65
Riding Mountain.....	99	4,628	118		4,746	1,993 11
Duck Mountain.....	39	1,414	47		1,461	679 07
Moose Mountain.....	134	3,561	284		3,845	1,025 25
Beaver Hills.....	38	1,294	75		1,369	392 70
Porcupine.....	16	580	73	157	810	347 53
Pasquia.....	9	79	20		99	30 15
Fort à la Corne.....	4	283	40		323	91 20
Pines.....	28	1,326	97		1,423	428 05
Nisbet.....	7	122	23		145	44 05
Big River.....	14	1,094	4	25	1,123	189 05
Steep Creek.....	3	250			250	63 25
Sturgeon.....	3	382	3		385	100 50
Keppel.....	44	1,646	287		1,933	511 00
Manito.....	113	2,807	986	58	3,851	1,171 40
Dundurn.....	26	808	171		979	305 80
Seward.....	29	409	360		769	424 60
Elbow.....	66	1,700	463	520	2,683	605 20
Big Stick.....	153	7,406	2,520	5,700	15,626	5,360 70
Cypress Hills.....	172	5,823	4,403		10,226	6,113 53
Cooking Lake.....	36	2,051	156		2,207	692 60
Crowsnest.....	269	14,794	2,863	7,631	25,288	10,189 36
Bow River.....	121	11,039	3,204	1,200	15,443	6,653 31
Clearwater.....	21	65	105		170	85 75
Brazeau.....	3		69		69	41 80
Athabaska.....	18	18	120		138	117 02
Lesser Slave.....	1	31	2		33	19 01
Total....	1,653	66,798	16,945	15,618	99,361	41,081 94

TABLE 4—Statement of Timber Cut on Forest Reserves under Authority of Timber Sales, Fiscal Year ended March 31, 1920

Reserve	Previous sales still operating	Sales made current year	Saw Timber	Mine Timber.			Railway Cross-ties	Tele-phone Poles	Dues collected
				Props	Props	Lagging			
			Ft.B.M.	Ft.B.M.	Lin. Ft.	Lin. Ft.	No.	Lin. Ft.	\$ cts.
Big River.....	1								
Fort à la Corne....	1	2	334,825						355 19
Porcupine.....	2	1	40,867						2,054 05
Pasquia.....	5	2	939,622						1,969 78
Brazeau.....	3	3	1,427,837	35,135	37,676	280,342			4,547 12
						Cords.			
Clearwater.....	1		147,545	1,713,415		955			4,162 70
Crowsnest.....	5	1	421,670	346,326					1,721 65
Cypress Hills.....	1								13 37
Lesser Slave....		2	1,658,601						
British Columbia Reserves.....	1	1	3,430,901					36,905	677 08
Athabaska.....		1	119,500		100,636		942,120		4,090 54
Total.....	20	13	8,521,368	2,094,876	138,312		942,120	36,905	19,591 48

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TABLE 5—Statement showing the Quantity of Timber Sold and Revenue due, Fiscal Year ended March 31, 1920, on Licensed Timber Berths within Dominion Forest Reserves

MANITOBA

Reserve	Timber Berths	Area in Reserve	Quantity Sold			Revenue		
			Lumber	Lath	Other* Products	Dues Payable	Rent Payable	Total Payable
	No.	Sq. Mls.	Ft.B.M.	No.		\$ cts.	\$ cts.	\$ cts.
Riding Mountain.	4	42.43	.....	.....	600	.....	222 15	222 15
Duck Mountain....	11	99.77	1,057,963	2,646,050	.....	5,578 04	499 90	6,077 94
Total.....	15	142.20	1,057,963	2,646,050	.....	5,578 04	722 05	6,300 09

SASKATCHEWAN

Porcupine.....	41	841.82	24,958,368	2,927,070	.....	14,342 68	2,515 70	16,858 38
Sturgeon.....	9	169.02	23,050,170	3,788,150	.....	15,555 17	847 53	16,402 70
Big River.....	3	260.77	90,010,372	4,329,650	.....	5,154 64	1,303 85	6,458 49
Nisbet and Pines..	4	80.69	.....	.....	10,134	1,455 28	173 15	1,628 43
Total.....	57	1,352.30	138,018,910	11,044,870	.....	36,507 77	4,840 23	41,348 00

ALBERTA

Crowsnest.....	11	215.38	8,651,396	.....	2,126,549	.....	1,374 70	1,374 70
Bow River.....	14	327.90	4,392,185	.....	2,613	1,797 29	1,825 60	3,622 89
Clearwater.....	4	371.52	.....	.....	.....	.....	1,887 80	1,887 80
Brazeau.....	11	163.85	89,880	.....	82,261	2,560 54	1,131 30	3,691 84
Total.....	40	1,078.65	13,133,461	4,357 83	6,219 40	10,577 23

BRITISH COLUMBIA

Total.....	11	133.57	3,567,063	13,629	3,023 17	667 85	3,691 02
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GRAND TOTAL

Grand Total..	123	2,706.72	155,777,397	13,690,920	49,466 81	12,449 53	61,916 34
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*The figures in this column indicate the number of units upon which the dues were calculated. They include 1,945 cords of wood, 82,861 railway cross-ties, 11,113 fence posts, 2,126,238 lineal feet of mine-props and 13,629 logs.

PART IV.

RECLAMATION.

REPORT OF THE DIRECTOR OF THE RECLAMATION SERVICE, E. F. DRAKE.

Reference was made in the report for last year to the sudden and widespread awakening of interest in irrigation throughout Southern Alberta and Southwestern Saskatchewan, and to the probability of another dry season, with practically complete crop failure, which would aggravate a condition even then very serious.

The event has proved even worse than the prediction. The year 1915 will long be remembered as the "year of the bumper crop." The following year was almost as good, while the yield was not as great, it was above average and the high prices made the crop almost as profitable as—in some cases more so than—that of the preceding year. But 1918 was a notably dry year with serious crop failures throughout the "dry belt" and drew heavily upon the scanty reserves of stored moisture in the soil. The season of 1919 was even drier than the two preceding years and as the reserves of moisture were largely exhausted, practically no crops were produced in the "dry belt," except where irrigation was practised.

In the following table, which is now published for the third consecutive year, an attempt is made to show the relationship between rainfall and the yield of the principal cereal crops, taking into account as well the prices obtainable for the crops, so as to indicate in a general way the gross profit of each crop to the producer. But, while the table clearly enough indicates a definite relationship between rainfall and crop production, there are other important factors to be considered, such as rust, which seriously reduced the yield of wheat in Saskatchewan in 1916; the disastrous frost of July 25, 1918, in Northern and Central Alberta and Saskatchewan; local losses from hail and from soil-blowing, etc.

But the most serious defect in the table is that, while it gives an accurate record of rainfall during the growing season at selected typical points, it shows the crop yield per acre for the entire province instead of for a limited district comparable with that for which the rainfall is given. It has been impossible heretofore to procure accurate crop statistics for such limited areas, although it is hoped that arrangements to do this can be made before long. The net result, therefore, is that the effects of scanty rainfall are not as forcibly indicated as would be the case if the rainfall and crop records were *both* limited to the drier districts.

The following tables are based upon the best information obtainable. The "normal prices" are estimated, and are possibly rather high, but accurate information of average prices in past years is not readily obtainable.

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TABLE SHOWING YIELD OF WHEAT, OATS AND BARLEY, FOR THE YEARS 1915-16-17-18-19. ALBERTA.

Crop and Year.	Yield per acre.	Average price per bushel.	Average price per acre.		Yield per acre.	Rainfall at Calgary, April to August.	
	Bush.	\$	\$	%	%	Inches.	%
Wheat—							
Normal.....	22.50 ¹	1.00 ²	22.50	100	100	11.56 ³	100
1915.....	31.12	.88	27.39	122	138	12.27	106
1916.....	24.99	1.33	33.24	148	111	8.93	77
1917.....	18.25	1.74	31.73	141	86	6.63	57
1918.....	6.00	1.92	11.71	52	27 ⁴	5.78	50
1919.....	8.00	1.83	14.80	65	36	7.49	65
Oats—							
Normal.....	42.00 ¹	.34 ²	14.28	100	100		
1915.....	45.91	.31	13.97	101	109		
1916.....	48.11	.46	22.13	155	115		
1917.....	34.00	.63	21.42	150	81		
1918.....	22.75	.73	16.61	116	54		
1919.....	23.75	.64	15.20	106	54		
Barley—							
Normal....	28.25	.50 ²	14.12	100	100		
1915.....	32.31	.44	14.27	101	114		
1916.....	29.04	.71	20.62	146	103		
1917.....	22.00	.98	21.56	153	78		
1918.....	16.50	.97	16.00	113	58		
1919.....	25.50	1.86	47.43	336	89		

¹Average for 10 years, 1908-1917. ²Estimated. ³Average for 30 years 1885-1914. ⁴Results effected by frost 25th July, 1918.

TABLE SHOWING YIELD OF WHEAT, OATS AND BARLEY, FOR THE YEARS 1915-16-17-18-19. SASKATCHEWAN.

Crop and Year.	Yield per acre.	Average price per cushel.	Average price per acre.		Yield per acre.	Rainfall at Swift Current, April to August.	
	Bush.	\$	\$	%	%	Inches.	%
Wheat—							
Normal....	18.50 ¹	1.00 ²	18.50	100	100	10.03 ³	100
1915.....	25.12	.91	22.86	124	136	10.14	101
1916.....	16.34	1.28	20.92	113	88 ⁴	14.09	141
1917.....	14.25	1.95	27.79	150	77	5.12	51
1918.....	10.00	1.99	20.00	108	54 ⁵	5.62	56
1919.....	8.50	1.84	15.64	85	46	7.38	74
Oats—							
Normal....	38.25 ¹	.34 ²	13.00	100	100		
1915.....	43.48	.32	13.72	106	114		
1916.....	43.06	.46	19.81	152	113		
1917.....	27.25	.62	16.90	130	71		
1918.....	21.50	.70	15.05	116	56		
1919.....	23.10	.70	16.23	125	63		
Barley—							
Normal....	26.75 ¹	.50 ²	13.38	100	100		
1915.....	31.74	.46	14.64	109	119		
1916.....	27.00	.77	20.79	155	101		
1917.....	21.00	1.00	21.43	157	79		
1918.....	17.00	.88	14.96	112	67		
1919.....	8.20	1.08	19.66	147	22		

¹Average for 10 years, 1908-1917. ²Estimated. ³Average for 30 years, 1885-1914. ⁴Results effected by rust. ⁵Results effected by frost 25th July, 1918.

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IRRIGATION DEVELOPMENT.

Three successive dry years have thoroughly awakened the settlers in the "dry belt" to the necessity of irrigating every acre of land to which water can be brought at reasonable cost. Even the advocates of dry farming now admit that their methods of tillage invite disaster scarcely less serious than drought itself. The success of dry farming as now practised depends primarily upon a system of summer-fallowing and frequent stirring of the surface so as to produce a mulch or blanket of fine soil particles which will prevent losses of moisture by capillarity. But this constant cultivation soon pulverizes the fine soil of the dry belt to a light powder which the frequent high winds blow about at will, either burying the seed or young crop or blowing them out entirely.

Irrigation, with greater variety of crops and with the radically different methods of tillage which necessarily accompany it, is at once the cure for soil-blowing as well as for drought, and there is now widespread and insistent demand that its benefits be extended wherever possible.

The Dominion Government has always recognized its responsibility for making at least preliminary surveys in order to indicate how, and where, the available water supply, which it holds in trust and administers, may be utilized to the best advantage. It soon became apparent, however, with the awakened interest in irrigation development, that demand would be made that the Dominion should not only make complete surveys, including the location and design of works, but that it should also either construct the required works or materially assist in financing such construction, notwithstanding that the organization of irrigation districts, the raising of money by bond issues with the land as security and the actual operation and maintenance of works constructed on the co-operative plan, are all governed by provincial rather than by federal laws, and that these laws were enacted by the Provincial Government upon the insistent request of the settlers themselves.

As the situation developed early in 1919 the Minister of the Interior considered it desirable that there should be a clearer understanding as to the division of responsibility between the Dominion and Provincial Governments. He therefore took the question up with the Government of Alberta and pointed out that the Dominion was being pressed from time to time to make surveys in different districts, involving in each case considerable expenditure; that these requests were at times accompanied by very direct intimation that the Dominion would be expected to assist in the further prosecution of the enterprises, and that there was seeming reluctance on the part of the provincial authorities to disassociate themselves from these intimations; that no appreciable area of the land requiring irrigation is owned by the Dominion; and that while the Dominion exercises general control over surface water the Irrigation Act and Regulations are quite adaptable to the carrying on of such development by districts or by the provincial authorities. The minister was therefore of opinion that, before committing his department, and the Dominion Government, to further and large expenditures for irrigation and survey work, there should be a clear understanding that the responsibility for anything in the way of development beyond the survey work that is a federal responsibility unless in any specific case Dominion lands are to a substantial extent to be benefited.

The minister did not ask that this responsibility be assumed by the province; in fact he stated explicitly that, so far as he was concerned, the Provincial Government was quite at liberty to reserve to itself the utmost freedom in so far as its commitment to the development of irrigation problems is concerned. But the minister did ask for a definite acknowledgment by the Provincial Government that the Dominion's responsibility towards irrigation should not extend beyond the survey work and general engineering assistance and supervision which he was ready to undertake, and he made it clear that unless he received such assurance he could not authorize the further survey work which he was being pressed to undertake.

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In the ensuing correspondence it was definitely stated that the Dominion Government could not assume any responsibility for actual irrigation development beyond the survey work and such supervision as had theretofore been given and would be continued. The Provincial Government finally acquiesced in this statement of the division of responsibility between the Dominion, on the one hand, and the provincial or local authorities, on the other.

Immediately such understanding was reached, the minister authorized the resumption of survey work.

Surveys had been begun in 1914 for the purpose of determining the location and area of land irrigable from the available sources of water supply in Southern Alberta, but this work was interrupted by the war and was not resumed until about July, 1919. Enough information was obtained from the surveys of 1914 and 1915 to roughly define several large tracts of irrigable land and to indicate, more or less definitely, how water could be brought to them. When field-work was resumed in 1919 it was decided to make complete planetable surveys of the irrigable tracts previously located and at the same time to make a thorough study of the water supply, with a view to the conservation of as much as possible of the flood water that has heretofore gone to waste. This necessitated a further study of possible canal locations and in some cases entirely new location surveys.

A brief general description of this work will be found in the report of the Commissioner of Irrigation, which is submitted herewith. The work was not begun until about July 1, and considerable difficulty was found in securing a sufficient number of engineers familiar with such work; consequently it was not found possible to complete even the programme of work laid out for the season. Provision has, however, been made for completing the work during the season of 1920.

The principal deterrent to further irrigation development is the difficulty of financing. The money for the construction of new works must be raised by bonds secured upon the land and irrigation bonds are not readily saleable at anything like par value. Notwithstanding that irrigated land in Southern Alberta and Saskatchewan is worth, at a conservative estimate, from twice to three times the price of dry land, investors are apparently not willing to risk the successful construction and operation of co-operative irrigation projects. Definite proof is readily available that irrigated land in the Lethbridge district has, through a long period of years, produced at least double the crop raised on dry land. The water supply for any of the projects now mooted is assured; the most careful supervision of the design and construction of works will be given by the Dominion Government; the Provincial Government will unquestionably exercise equally strict supervision over the construction expenditures and will lend its assistance in collecting the principal and interest payments year by year as they fall due. But notwithstanding all this investors fight shy of irrigation bonds.

The only practicable solution of the problem seemingly is the purchase of the bonds either by the Provincial or Dominion Government, but this is a question of policy that must be decided by the Governments, and its further discussion in this report would be inappropriate. It is to be hoped, however, that some solution of the problem will be found quickly.

DRAINAGE.

Although land drainage on a large scale was not undertaken by the Reclamation Service until the spring of 1919 the work has already developed beyond expectation. Great interest is being shown by small landowners in the drainage of shallow lakes or swamps, and many projects of this kind have already been authorized, while the number of applications received has severely taxed the resources of the engineering staff available for inspection work.

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By co-operative arrangements between the Dominion and Provincial Governments, bona fide settlers are encouraged to purchase swampy or submerged lands at a merely nominal price, and subject only to the conditions that adequate drainage works be constructed and thereafter maintained in serviceable condition. This is regarded as good business policy as such lands are, in their present condition, worthless and non-productive, and considerable areas of such lands in any district materially retard its development. No such sale is authorized where the area to be reclaimed exceeds 1,280 acres, or the cost of the drainage works is more than \$5,000.

Larger areas may also be reclaimed by drainage under co-operative arrangements between the Dominion and the provinces, and several drainage districts have already been organized in both Alberta and Saskatchewan, and works are under construction in some of these. Money for construction purposes is raised by bonds secured upon the lands and no serious difficulty has so far been experienced in selling drainage bonds at fair prices.

In still other cases, where the Dominion Government owns the bulk of the land, surveys are made and actual construction may be undertaken by the Dominion and the cost recovered by the sale of the reclaimed land. Several promising projects of this kind have already been investigated and in one case—Waterhen lake in Northeastern Saskatchewan—surveys have been completed, a drainage district has been organized under provincial laws, and, as this report is written, tenders are being asked for the construction of the works. Should this project prove successful, two or three other large projects are ready for development as soon as funds are made available.

Notwithstanding the necessity for economy in the expenditure of public money, it may be confidently asserted that large expenditures on drainage work are amply justified. Large areas of practically worthless land require reclamation. In its present condition this land breeds mosquitoes, makes travel difficult, retards the development of other land in the district, and produces nothing of value. When drained it becomes good farm land, or in some cases hay and pasture land, makes good roads possible, increases settlement, and its sale after reclamation will return to the Dominion treasury at least the cost of its reclamation and in most cases much more. It is therefore sound policy that these land assets, which are now unproductive, or worse, should be reclaimed, particularly when such reclamation can be made to pay for itself.

There are submitted herewith brief reports by Mr. F. H. Peters, Commissioner of Irrigation and Chief Engineer, on the work of the Irrigation Division of the Reclamation Service, and by Mr. R. J. Burley, Assistant Director and Chief Engineer of the Drainage Division, on the work of that division.

REPORT OF IRRIGATION SURVEYS AND INSPECTIONS.

By F. H. PETERS, *Commissioner of Irrigation and Chief Engineer.*

GENERAL.

As was indicated in last year's report, due to the succession of two dry years 1917 and 1918, a very strong movement developed in the "South Country" during the winter of 1918-19 in favour of irrigation. The year of 1919 was almost as dry as 1918, with the result that the people in Southern Alberta—both farmers and business men—have at last become generally convinced of the great desirability, if not necessity, of irrigating every possible acre in the southern districts.

As a result very strong demands arose for the completion of the surveys of all the large projects which have been contemplated and in addition a very large number of applications were received during the year from persons who wanted to construct

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small private irrigation schemes. It was not found possible to complete either all the large survey work required, or the necessary inspection of the small private schemes. It is consequently expected that a very heavy programme of work will have to be undertaken in both these departments during 1920.

STREAM ADMINISTRATION.

In the early stages of irrigation development it was chiefly necessary to consider the local water supply in each case, but, as the demand for water increased, it became essential to take a broader view of the situation. It is now the practice to ascertain the effect of all new schemes upon the watershed to which any source of supply is tributary.

It has always been the practice of the department to limit grants to the quantity of water believed to be available under average conditions, but as the demand increases it is necessary to study the conditions in greater detail to ensure that all water is applied to beneficial use. The conservation of flood waters is a question of special importance which will become more pressing as the value of irrigated lands increases.

Recent experience indicates that the conditions of supply are critical at certain periods in several of the Cypress Hills drainage basins, and water-masters have been appointed to regulate diversion in these areas. For satisfactory administration it is essential that all water rights be clearly defined and the avoidance of future disputes and litigation is one object of the work now being accomplished.

HYDROMETRIC SURVEY.

Mr. A. L. Ford, who succeeded Mr. P. M. Sauder as Chief Hydrometric Engineer on January 1, 1920, has submitted the following brief report indicating the scope of this part of the work:—

“The drought of 1919, following the dry years of 1917 and 1918, has very strongly emphasized the importance of procuring records of stream flow for a long period of years so as to obtain the range of flow. At stations established throughout the length and breadth of the provinces of Alberta and Saskatchewan the records show that the total discharge for the past year, is, in almost all cases, the lowest for any year since the inception of the survey in 1909, although no doubt the discharge was just as low or lower during the long drought periods before that time.

“The past year has seen a great increase in proposed irrigation development. The records of stream flow have been called upon very frequently to determine the feasibility of schemes and in many cases to determine the area that could be included in the project. The records of minimum flow obtained during the past climatic year are therefore proving of exceptional value at the present time.

“The Survey acted in conjunction with the Montana division of the United States Geological Survey in obtaining the flow of International streams in the St. Mary River and Milk River drainage basins. This information was used by representatives of the Reclamation Services of the United States and of Canada as basic data in the division between the two countries of the waters of the St. Mary and Milk rivers.

“During the year sixty current-meters were rated, ten belonging to the British Columbia Hydrometric Surveys, three to the Manitoba Hydrometric Surveys, five to the Ontario Hydro-Electric Power Commission, four to the Canadian Pacific Railway Company, two to the United States Department of Agriculture, and the balance, thirty-six, to this office.

“The field-work was carried on throughout the year in spite of the difficulty met with in obtaining and keeping the services of engineers due to the low remuneration offered. The office work, however, had to be sacrificed to the field-work and has, therefore, fallen behind. The difficulty of keeping up the staff is shown by the fact that

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to maintain an establishment of some twenty engineers, thirty-two were employed at one time and another during the year without succeeding in keeping the staff up to full strength throughout the year.

"During the open-water period, records were taken at one hundred and fifty-seven regular gauging stations on streams of Alberta and Saskatchewan, at about one hundred and seventy-five gauging stations on irrigation ditches and canals and at twenty-eight stations on lakes. Winter records were taken at eighty-eight stations on streams during the past winter.

"The Annual Reports of the Hydrometric Survey giving information as to run-off at the special stations in the provinces of Alberta and Saskatchewan for the climatic years which ended on September 30, 1917, and September 30, 1918, were published during the year. Copies of these reports can be obtained from the Director of the Reclamation Service at Ottawa, or the Commissioner of Irrigation at Calgary. For the purpose of economy in printing these reports, considerable data formerly published have been left out. Any one wishing to obtain these additional data should make a written request of the Commissioner of Irrigation stating the particular data required."

FIELD-WORK.

Domestic Water Supply.—During the three years 1917 to 1919 reports to the number of fifty-three, twelve and three, respectively, have been submitted concerning small domestic water supplies. During the same period reports to the number of two hundred and ninety-one, two hundred and forty-five and thirteen, respectively, have been submitted giving data regarding wells. These latter include a number of reports on artesian wells and reports kindly submitted to us by persons and organizations interested in the development of the country.

Artesian Wells.—In following up the development of the artesian well area in Southern Alberta, samples of water were obtained from six artesian wells and submitted to the Dominion Chemist for analysis.

The outstanding characteristics of these waters considered as a series are their practical freedom from calcium and magnesium compounds and their essential uniformity as regards sodium carbonate. It is the latter constituents which mark the element of danger in considering these supplies as water for irrigation purposes.

Though in limited quantities and occasionally applied, these waters might be used for a time on soils with good drainage without marked injurious results, they are not safe or suitable waters for irrigation purposes.

Stock-watering Reserves.—During the year a special effort was made to complete the inspection of these reserves and some pieces of land were found which are suitable for soldier settlement. The great bulk of the reserves do not constitute particularly good agricultural land and have been recommended for continuance as reserves, except in certain "long grass" districts where there does not seem to be any necessity therefor.

One hundred and one reserves were inspected and reported on.

It is suggested that the time is not far distant when it will be possible to administer these stock-water reserves and sanctuaries in such a manner as to make them serve the purpose for which they are actually intended. At the present time these reserves are of very little use, because they are so heavily pastured all the year round that, if a year of drought does come, there is no grass left on them.

There have been a number of complaints about the reserves, as handled at present, due to the fact that very often a lot of stock is driven by different owners on to a small reserve in a fenced district. The stock is given no further attention and by wandering becomes a nuisance to the owners of the land near the reserve. In other cases the reserves are found completely fenced in and used exclusively by one individual who has usually let it be understood in the neighbourhood that he has a lease or some other right to the land.

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The essential thing is to have all these reserves fenced and the grass all reserved from April 1 in every year until say the end of August when, unless a condition of drought was declared existant, the reserves could readily be leased for fall and winter pasture. These lands probably have a pastoral value at the present time sufficiently high to produce enough revenue to pay for all fencing and provide for administration on sound business lines.

South Saskatchewan Diversion Project.—During the summer and autumn of 1919, popular attention was again brought back to a realization of the fact that the South Saskatchewan river is the only sufficient available source of supply for the Regina-Moosejaw district and the project is now being considered afresh by the Provincial Government. An Act was passed at the last session of the Saskatchewan Legislature providing for the appointment of a commission whose duty it will be to inquire fully into this matter.

Sevenpersons Drainage Basin Investigations.—A study of the proposed water supply of the projects above mentioned shows that they probably could not receive the legal duty of water of one and one-half acre-feet of water every year. For this reason no recommendation has been made in regard to either scheme pending further investigation and study. Investigations were commenced so late in the season that it was impossible to complete the field-work this year. Arrangements have been made to complete this work early next season.

Cypress Hills District, North.—One hundred and three irrigation inspections and seven surveys were made. Three hundred and twenty-two stream gaugings were made and four new gauging stations were established. The number of miles travelled by train was 2,506; by motor-car, 6,997; and by other means, 929. These figures include the work done on the special measurement of early spring run-off.

Cypress Hills District, South.—Seventy-two irrigation inspections and twenty-eight surveys were made. The number of miles travelled by train was 635 and by other means, mainly horse vehicle, 1,255. The conditions in this district were very difficult during the season.

Macleod District.—One hundred and one irrigation inspections and nine surveys were made. Four hundred and three stream gaugings were made. The number of miles travelled by train was 3,272; by motor-car, 9,146, and by other means, 386.

Special Inspections.—The total number of inspections made in Saskatchewan was seventy, including thirteen surveys of all descriptions involving 9,307 miles of travel by train, and 2,346 miles by motor-car or other means. The total number of inspections made in Alberta was forty-eight, including eleven surveys involving 4,352 miles of travel by train and 1,451 miles by motor-car or other means.

MUNICIPAL WATER CONSUMPTION DATA.

The collection and compilation of municipal water consumption data were inaugurated towards the end of the year 1914, and in the year 1915 we received information complete for the year from fifteen cities and towns in Alberta and Saskatchewan. In the following year we received records for the whole year from the same cities and towns. During the year 1916 an endeavour was made to obtain these data from a greater number of places, with the result that for the year 1917 we received complete records from twenty-one cities and towns in Alberta and Saskatchewan. During 1919 records were received from eighteen cities and towns.

WESTERN SECTION, C.P.R. IRRIGATION BLOCK.

The remarks made in the 1918 report regarding the Western Section are equally applicable this year. The demand for water was the heaviest in the history of the

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project and many farmers demanded water this year for land which has not been watered for many years. This required considerable work on the company's part in reopening small ditches which had fallen into bad repair through disuse. Somewhat more than 80 per cent of the total length of all the canals and laterals in the system was operated during the season in order to make the required deliveries of water. In addition to the work referred to above the company carried out their regular routine of making improvements to the system wherever these seemed to be necessary or desirable. This work was considerably interfered with by the shortage of labour throughout the season and by the very early freeze-up in October.

Figures submitted by the company covering the whole of this section show that 31,908 acres were irrigated during the season.

EASTERN SECTION C.P.R. IRRIGATION BLOCK.

No new construction work of any magnitude was done in this section during 1919, although a good deal of work was done in repairing and enlarging existing ditches, especially in the Bassano and Patricia districts, where the constructed laterals were considerably enlarged. At Brooks the main lateral which waters the land in the immediate vicinity of town was enlarged and extended.

A pumping plant was installed on the Canadian Pacific Railway land immediately west of the town, which, obtaining water from the last-mentioned ditch, raises it some twenty feet and distributes it throughout the town of Brooks for the use of truck gardens, trees, etc. Previous to the installation of this plant no water was available for irrigation purposes in the Brooks townsite.

There still remains a considerable block of land in this section which has not yet been finally classified by the department and no further progress in this connection was made during the year. The company sold a great deal of land last year, and has now disposed of practically all of the irrigable land already classified which is closest to the railways already constructed.

The season of 1919 was dry and hot, being quite similar to 1918. The demand for water was heavy and consistent. Very good crops were obtained in the Bassano and Duchess districts. Gratifying results were obtained in the growing of alfalfa and clover seed, some almost phenomenal yields being obtained. On the dry lands very little grain was grown, the crops in many instances being total failures. The St. Julian colony, lying south of Tilley, was again farmed by the company, which employed a large staff of irrigators and had some very good returns. A certain area is being seeded to alfalfa on each of these farms. Figures submitted by the company covering the whole of this section show that 43,460 acres were irrigated during the season, as against 24,440 acres in 1918.

ALBERTA RAILWAY AND IRRIGATION COMPANY.

This company is controlled by the Canadian Pacific Railway Company, and its irrigation tract is commonly referred to as the C.P.R. Lethbridge section. The city of Lethbridge is the centre to which the irrigated land is tributary.

The season was again very dry in this district and there was a very heavy demand for water, which could not be fully met by the company. From about July 10 to October 15, the main canal was diverting practically the whole available flow of the St. Mary river and during August and September the total available flow of the river was not sufficient to meet the demands. Owing to the fact that the company's operating staff showed good judgment in dividing or rotating the available supply, there was not much general ground for complaint by the water users. Most of the crops received sufficient water, so that they did not suffer greatly. Very little water, however, was stored in the Chin reservoir for the supply of the Taber Irrigation District next year.

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The time has come when, in order to ensure themselves a sufficient supply of water in every season, the company should construct a reservoir at one of the several sites existing which command all of the irrigable land.

The company carried out a considerable amount of improvement work on the system during the season. The largest undertaking, which was about 75 per cent completed when inspected, was the replacing of the old wood diversion works at Magrath by a new reinforced concrete structure. In addition to this the intake to the main canal at Kimball was lowered two feet in order to increase the diversion capacity and several timber drops were built in natural channels, which are used as canals, to stop erosion. The enlargement of Chin No. 1 canal was continued during the year and completed all but about five miles.

The very hot season which was experienced produced probably the best alfalfa crop that has ever been harvested in the district, and with the extraordinary high price that was received for the crop, every alfalfa field was a veritable bonanza to the owner. It can be said, without any fear of contradiction, that this irrigated district, particularly the Coaldale district east of Lethbridge, is the most prosperous agricultural district in Alberta, and probably in any of the three prairie provinces. To any one driving through the district in the autumn of any recent year the encircling vista of stack after stack of alfalfa or some other hay crop indicates that the obvious reason for this great prosperity is the stabilizing of the agricultural industry by the production of forage crops on a comparatively large area.

Figures submitted by the company for the whole of this section show that 71,969 acres were irrigated during the season. This shows a small increase over the preceding year.

THE CANADA LAND AND IRRIGATION COMPANY.

During the summer the company carried on a good deal of miscellaneous construction work, designed to create a continuous capacity of not less than 400 c.f.s. throughout their main supply canal and reservoir system from the intake on the Bow river down to the Little Bow reservoir five miles southwest of Travers. This work included the building of several temporary wooden flumes and earthwork cut-offs to improve location, the strengthening of the earth embankment through the lower portion of the Little Bow section and the construction of additional spillways.

During 1918 the main canal was operated down to Lake Macgregor reservoir, and records now available show that 13,563 acre-feet were delivered into it. At the end of the season the reservoir had been filled up nearly to the elevation of the outlet gates at the south dam, and it was expected that water would be drawn off from the reservoir early in the spring of 1919. This expectation was not realized, however, because it was found that some high ground existed in the bottom of the reservoir near the south end and the water had to be raised several feet before it ran down to the outlet gates.

During the season of 1918, 82,170 acre-feet were delivered into Lake Macgregor reservoir through the main canal which was operated, with some stops for repairs, from April 19 to October 24. The rate of delivery varied up to the maximum of 415 c.f.s. with an average for the season of 238 c.f.s. There is now a good head of water at the outlet gates for operation during 1920.

The water reached the outlet gates at the south dam on September 11 and a small flow was immediately carried on through the main canal for the purpose of *priming* the Little Bow section. This work was carried on with ordinary interruptions until October 25 when the water had reached *mile eleven* below the south dam. On this date there was a serious break near *mile nine* where a high fill slid out and the water had to be turned out of the canal. The work of repairing this break has been carried on during the winter, and while it has not been inspected, it is understood that the repairs have been made satisfactorily and that the canal will be ready for operation in the early spring of 1920.

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Speaking generally of the whole main canal, there are a good many points of weakness, due to faulty original location, which will probably cause considerable difficulty in operating the canal for a number of years. The company is now, however, under very efficient management which gives assurance that wise and energetic action will be taken to overcome such difficulties as may arise.

During the year a small party was engaged in classifying the irrigable land which the company intends to first put on the market in the western section. This work was very carefully done and included a soil survey of the area covered. The gross area inspected was 37,628 acres, of which 75 per cent or 27,919 acres was classified as irrigable. The work covered the period from June 24, to November 12, and cost five cents per gross acre and seven cents per irrigable acre.

COALDALE-LETHBRIDGE WATER USERS ASSOCIATION.

As a result of the activity of this association one Water Users District has actually been erected and one other has completed all necessary formalities save holding the actual election. The Coaldale Water Users District was erected under the Alberta-Irrigation Districts Act on February 3, 1920. The notice of application for erection of the East Lethbridge Water Users District (formerly referred to as the North Lethbridge Water Users District) was published in the *Alberta Gazette* on February 14, 1920.

IRRIGATION DEVELOPMENT ASSOCIATION.

This association was maintained quite actively throughout the year and continued the work of acting as a central bureau for all activities in connection with further irrigation development. It is rather difficult to describe just what work was done because as a rule its function was to father the first activity in a certain district and then later on when matters became advanced the district would usually form its own separate organization to look after its own special interests. The association has done a great deal of useful work in starting the movement of forming irrigation districts and particularly in keeping all different districts or organizations working as far as possible along the same lines. It would seem that in this matter of keeping the general interests of the south country co-ordinated the association has a field for further useful work for many years to come.

It is fitting in dealing with this association to note the trip through the irrigated districts of Southern Alberta which was made by the Hon. Arthur Meighen, Minister of the Interior, in company with Hon. James A. Calder, Minister of Immigration and Colonization. The trip, which was made during the last week in August, included visits to Medicine Hat, Calgary, Macleod and Lethbridge, at which place a very large meeting containing many irrigation farmers was addressed by both the ministers. This trip was much appreciated by the large number of people in Southern Alberta to whom the question of irrigation development was the one great issue of the year.

TABER IRRIGATION DISTRICT.

The Canadian Pacific Railway Company, which has agreed to construct works for this district let a contract as soon as possible after arrangements had been completed with the district and work was started on July 24, 1919. The summer season was not favourable for moving earth because the ground was so dry. Snow-storms coming on unexpectedly early caused the sub-contractors to start leaving the work on October 21, and by November 18, they had all stopped. As an exception, the timber contractors worked on until January 15, 1920. Very satisfactory progress was made during the short time available and the work is now more than fifty per cent completed.

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As this report is being written (April 20, 1920) the contractors have started in again on the work, although it is now too wet to make much headway with the earth-work. If the work progresses favourably the ditch may be ready to carry water on Dominion Day, 1920.

LETHBRIDGE NORTHERN IRRIGATION DISTRICT.

The district was advertised in the *Alberta Gazette* of July 31, and the vote for erection as taken on September 20, and carried almost unanimously. The district was formally erected on October 23, 1919.

The Government of Alberta employed Mr. George G. Anderson as consulting engineer and he submitted a report on the district to the Provincial Government dated January 17, 1920.

During the last assembly of the Alberta Legislature a large amount of discussion was devoted to the new Irrigation Districts Act, the Water Users Districts Act and the proposal that the bonds of the Lethbridge Northern District should be fully guaranteed by the Alberta Government. The two Acts mentioned above were passed, but it was decided not to guarantee the bonds and instead a special Act was passed which provided for a specified sum of money which might be used in meeting certain debts of the district in the event of default in payment.

As this report is being written the trustees of the district are sitting as a court of revision and their intention has been announced of holding a vote on the issue of district bonds just as soon as possible. There are, however, a number of serious questions which have to be dealt with before much further progress is made. The question of enlarging the present boundaries of the district is one that requires serious consideration and that should be dealt with before the issue of bonds. The whole question of sale of bonds is made very difficult by the present state of the bond market, which probably will not look favourably upon Canadian irrigation bonds without a Government guarantee.

NORTH MACLEOD IRRIGATION DISTRICT.

Early in 1920 petitions were circulated and signed for the purpose of forming the land in township 9, range 26—township 9, range 25—and township 10, range 25, lying below the main Lethbridge northern canal, into an irrigation district. This was spoken of as the North Macleod Irrigation District and the original proposal was to enter into an agreement with the Lethbridge Northern District for a supply of water. The most recent development has changed this plan to what is the more desirable one of endeavouring to have the boundaries of the Lethbridge Northern District enlarged so as to include this area of land.

SOUTH MACLEOD IRRIGATION DISTRICT.

This district lies between the rough breaks of the Ridge Between the Rivers and the Waterton and Belly rivers and runs to a point near Ewelme. The irrigation of this area contemplates a diversion from the Waterton river, either direct or from the Belly river, through the works of the United Irrigation District.

Unfortunately it was not found possible to complete the investigations in connection with this project during the field season, but some instrumental survey work was done and also some further reconnaissance work. It is now thought that it will be feasible and economical to divert direct out of the Waterton to serve this project. An eye reconnaissance in connection with the suggested diversion from the Oldman river near Brocket indicated that this would not be feasible or at any rate not so economical as a diversion from the Waterton river.

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The boundaries of the proposed district have been outlined by the interested land-owners for lands to be irrigated by direct diversion from the Waterton river. The petitions for the erection of the district were circulated and signed during the winter and submitted to the Provincial Government on March 25, 1920.

BARONS-CARMANGAY IRRIGATION DISTRICT.

There was some opposition to the formation of this irrigation district but finally, after some alteration of boundaries, particularly in the vicinity of Carmangay town, petitions were signed and submitted to the Provincial Government on January 17, 1920. No official action has been taken as yet towards the erection of this area into an irrigation district. It is understood that later, plans to enlarge the boundaries of the Lethbridge Northern District to include this area, were adversely voted upon by the interested parties.

SOUTHERN IRRIGATION DISTRICT.

This district was referred to in last year's report as the Magrath-Raymond-Stirling Irrigation District. Petitions for its erection were circulated during the early autumn and finally signed and submitted to the Provincial Government in October, 1919. The notice of the application to form an irrigation district was published in the *Alberta Gazette* of January 15, 1920. It was erected by an order dated March 16, 1920.

As indicated in last year's report this district is already partially served by the Alberta Railway and Irrigation Company's system. The idea of forming the district is to gain a water supply for those lands not now served by the company's canal system.

NEW DAYTON IRRIGATION DISTRICT.

This proposed district comprises part of the land in the proposed Lethbridge Southeast Project but with the land at the east end of range 15 omitted. The west end of this district meets the east end of the Southern Irrigation District. The petitions for the erection of the district were circulated and signed during the winter and submitted to the Provincial Government on April 30, 1920.

WARNER-MILK RIVER IRRIGATION DISTRICT.

The area within this proposed district also comprises land formerly included in the Lethbridge Southeast Project and is all commanded by the canal already constructed (but not used) by the Alberta Railway and Irrigation Company which was planned to divert water from Milk river. The petition for the erection of this district has been circulated and largely signed. Owing to the absence of some of the owners there are some signatures which may yet be obtained, and on account of this fact and some other details the petition has not yet been submitted to the Provincial Government.

LETHBRIDGE NORTHERN PROJECT, RETLAW-LOMOND DISTRICT.

Preliminary surveys were made in the fall of 1914, to determine the possibility of diverting water from the Canada Land and Irrigation Company's system for certain lands in ranges 17, 18, 19 and 20, east of the Little Bow river, and between that river and the block of land owned by the above company. This work was reported in our 1919 Report under the caption "Sundial Water Supply and Irrigation Project."

The primary object of these surveys was to determine some feasible system of canals to serve this area with water for domestic and stock-watering purposes, utilizing

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as far as possible, natural channels. Sufficient data were obtained to show that approximately 93,700 acres of land which would be greatly benefited by irrigation could be commanded by a system of canals if the necessary amount of water is available. Further investigations made the following year, determined the possibility of extending that project across the Little Bow river to serve these lands, either on the basis of irrigating not in excess of forty acres per quarter-section, or the entire irrigable area. Preliminary figures indicate that on the forty-acre water right basis the total irrigable area will be about 58,000 acres and if all land possible were irrigated the total would be about 100,000 acres.

LETHBRIDGE SOUTHEAST PROJECT.

The area effected by this project is practically the lower slope of the Milk River ridge. The surface is rolling and rather rougher than is the case with most tracts of irrigable lands. The area as a whole, however, will require a very small amount of concentrated cost except in the case of drop lines. It was found that a comparatively large area of each quarter-section could be put under irrigation with very little double fill or levee. The surface soil generally is a light clay loam with a subsoil of heavy clay loam to clay and hardpan in the lower lying lands. In the upper lands, and especially in the vicinity of Warner, the surface is sandy loam and as a rule the subsoil is heavy. The possibilities of drainage are exceptionally good owing to the network of natural watercourses which run to Verdigris coulee.

A field survey party was also employed in running an improved location for the main supply canal between the Belly and St. Mary rivers and completing surveys of reservoir sites at Taylorville and Lumpy Butte. The party commenced operations on July 22, 1919, and was disbanded on November 10, 1919. About another week was spent running some necessary levels and taking topography. Considerable time was lost on account of bad weather and the number of days actually worked was 78. During this time the party ran 98.6 miles of traverse with profile and topography; 28.2 miles of traverse with profile only; 45 miles of preliminary levels; 123 miles of check levels; made 40 land ties; completed contour surveys of reservoir sites over 2,000 acres and established 8 permanent bench-marks.

During the winter the large plans in connection with this work were plotted and a projection made for the relocated main canal between the Belly and St. Mary rivers.

In the year 1914 a preliminary survey was made of the proposed dam site on the St. Mary river in section 4, township 25, West 4th meridian, and a contour survey was made of the reservoir site. Since the proposed dam at this site is one of the important features of the project, it was considered advisable to make a very detailed survey and to complete the investigation by making test borings of the foundations. The work was commenced on November 1 and completed on November 6, 1919. The survey was made entirely by stadia and all rock outcrops were accurately located and a section developed. Test borings are being made of the foundations at the present time so that upon the completion of this work it will be possible to estimate the cost of this structure and to determine definitely the feasibility of diverting the St. Mary river at this point.

Upon the completion of the St. Mary river dam site survey, surveys were made of the dam sites at the Waterton lakes. These surveys were commenced on November 10, and completed on November 14, 1919. In making estimates of the available water supply from the Waterton river it has always been considered that it would be possible to store five or six feet in the Upper Waterton lake without damaging the park and the amount of water considered available was estimated on that basis. By constructing a high dam at the "Narrows" on the Upper Waterton lake it would be

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possible to store a very large quantity of water and make it feasible to divert and put to beneficial use a large percentage of the flow of the Waterton river. The additional storage would be of enormous commercial value. Two dams sites were developed and plans have been placed on file.

UNITED AND LONE ROCK PROJECTS.

Instructions were given for a complete survey to be made of the United Irrigation district, including an extension to serve the Lone Rock district and later on, of the South Macleod district, provided it were found from a reconnaissance that it is feasible to irrigate the lands in this district. Between July 21 and November 12, 1919, the duration of the field season, the actual number of working days completed by the party was 91. During this time the party ran 131 miles of levels, 92 miles of traverse for the main canal, 80 miles of traverse for distributary canals and 89 miles of check levels. Three permanent iron bench-marks were established by the party.

The United and Lone Rock districts, which consist of a comparatively narrow strip of land between two large streams, the Belly and the Waterton rivers, lie close to the mountains with very irregular and steep slopes. Not only is the surface irregular and cut up by small watercourses, but the whole area has a heavy fall to the northeast. An idea of the general slope of the country may be gained from the fact that the Belly river has a fall of approximately forty feet to the mile through township 3, where the proposed intake is located.

During the winter a complete set of plans was prepared and traced, showing the system proposed to be constructed to irrigate 14,392 acres in the United and 8,621 acres in the Lone Rock districts and an estimate of the cost of construction has been prepared. Owing to the fact that a number of features in connection with this proposed development has not as yet been finally decided, the estimate is not being published in this report.

NORTH SASKATCHEWAN DIVERSION PROJECT.

The first preliminary report on this project was prepared by the commissioner on August 17, 1915. During 1919, a general but a hurried reconnaissance of the whole project was made by the commissioner and local instrumental reconnaissances were made by other engineers. A very large amount of instrumental survey will be required before this great project can be definitely developed and reported on. At the present time it is only possible to outline the general boundaries of the areas involved and to indicate our present opinions which will be subject to correction when more information is available.

The proposal is to gain the main supply of water by tapping the North Saskatchewan and the Clearwater rivers near Rocky Mountain House. Probably the Red Deer, the Blindman and the Battle rivers could also be diverted and their waters utilized. The total available flow from all these sources from April to November is 5,800,000 acre-feet.

As a result of the reconnaissance referred to, the present feeling is rather that the area for development should be restricted to the area lying to the south of the railway line running from Coronation to Kerrobert, from Kerrobert to Doddsland, from Doddsland to Biggar, and from Biggar to Saskatoon. Even with this restriction an immense district is affected comprising a rectangle with dimensions of roughly 130 miles by 180 miles. The nearest edge of this area is about 200 miles from the most distant original source of supply, the North Saskatchewan river in township 39, range 9, West of the 5th meridian, and from this point it is about 350 miles as the crow flies to the lower end of the proposed area near Saskatoon.

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Tentative schedules, which have been prepared, indicate that the gross acreage in the districts which appears to be suitable for irrigation is 2,900,000 acres. Assuming that forty per cent of this could actually be irrigated the net irrigable area would be 1,160,000 acres. Speaking generally of the whole area the opinion is held that something along the line of the so-called forty-acre tract proposition (or twenty-five per cent irrigation) for the purpose of growing hay, providing water for summer pasture and water for drinking purposes would be desirable.

DUTY OF WATER AND IRRIGATED CROP REPORTS FOR 1919.

Work at the Strathmore station was discontinued with the close of the 1918 season on account of the impossibility of securing reliable information regarding duty of water data due to the presence of the ground water table within three to four feet of the surface.

Experimental plot work was carried on at Brooks and Ronalane in the same manner as for 1918.

REPORT ON DRAINAGE SURVEYS AND INSPECTIONS.

By R. J. BURLEY, *Assistant Director and Chief Engineer of the Drainage Division.*

In his annual report for last year the director traced briefly the negotiations carried on by the Dominion Government and the provinces of Alberta, Saskatchewan, and Manitoba relating to an arrangement whereby apparently conflicting interests could be brought into harmony and a progressive policy regarding the important question of drainage formulated by each of the parties to the agreement. The agreement reached was made effective by the enactment of "The Reclamation Act," Chapter 5 of the Statutes of Canada, 1919, the "Reclamation Act of Alberta," and the "Reclamation Act, 1917," of the province of Saskatchewan, together with the Drainage Regulations of the Dominion Government, sanctioned by Order in Council dated January 14, 1919. Provision is made in the Dominion Reclamation Act for its application to Dominion Lands in the province of Manitoba when the necessary legislation is enacted by that province.

The formation of the Drainage Division of this service was approved by the minister in February, 1919, and work was at once commenced to build up an organization capable of handling drainage surveys, inspections, and construction as efficiently and economically as possible. Owing to the amount of necessary preliminary work, both in engaging experienced engineers, draughtsmen, and clerks, and making an office investigation into the projects which had been brought to the attention of the department, a somewhat late start was made on actual field-work and the parties were not able to commence operations until about June 1. Winter conditions set in throughout the northern portions of Alberta, Saskatchewan, and Manitoba early in October, slowing up many of the survey operations; on the other hand, some of the work, such as sounding and carrying lines over muskegs, was facilitated by winter conditions, so that while living conditions were rendered rather unpleasant the parties were able to carry on field-work until December. In one case work was commenced in the middle of November and continued throughout the winter. On the whole, the survey season of 1919, being the third dry season in succession, was particularly favourable for drainage surveys, and, as a consequence, very good progress was made in the investigation of the projects which had been brought before the department from time to time by petition, application to purchase, or otherwise.

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DEPARTMENTAL PROJECTS INVESTIGATED.

ALBERTA.

Bittern Lake, Tps. 46 and 47, Rges. 21 and 22, W. 4th Mer.

This project and that of the Big Hay Lake Drainage District No. 12 of Alberta are closely inter-related and depend largely upon each other for success. From time to time the attention of the department has been drawn to the desirability of drainage in this district, and petitions both for and against it have been received.

Complete contour surveys were made last season, canals were projected, and estimates of cost completed for five possible developments. It has been found that provision can be made to carry off the drainage from Big Hay lakes without effecting the water-level of Bittern lake, at an estimated cost of from \$20,000 to \$25,000, while the waters of Bittern lake can be lowered $4\frac{1}{2}$ feet, $8\frac{1}{2}$ feet, $12\frac{1}{2}$ feet, or completely drained, at an average cost per acre of approximately \$18, \$16, \$12, and \$13.50, respectively. The areas reclaimable under the above projects will be 3,000 acres, 4,700 acres, 8,400 acres, and 12,000 acres, respectively. Since a portion of the cost of this project would be properly chargeable to the Big Hay Lakes Drainage District, the cost per acre above estimated would be considerably decreased should both projects be constructed.

Cooking, Hastings, Ministic, and Sisib Lakes, in Tps. 51 and 52, Rges. 20, 21, and 22, W. 4th Mer.

This group of lakes, lying to the west of Beaverhills lake, was completely surveyed with a view to lowering or completely draining them. This, however, proved to be undesirable and the investigation showed that any advantage gained would be offset by equally important disadvantages.

Beaverhills Lake, Tps. 50, 51, 52, and 53, Rges. 17 and 18, W. 4th Mer.

Representations made to the department at intervals during a period of several years indicated the desirability of an investigation to determine the feasibility of drainage in this district and complete contour surveys were accordingly undertaken during the season of 1919. These surveys demonstrated that complete drainage was not feasible on account of the enormous cost, but a scheme was developed whereby over 20,000 acres could be reclaimed by lowering the water-level about 8 feet, at an estimated cost of slightly over \$17 per acre. There is little doubt that in the near future this sum will be considered a modest outlay per acre for reclamation in this fertile area, but at the present time there are several other projects where reclamation can be carried out at a much lower cost.

Smoky Lake, Tps. 59 and 60, Rges. 18 and 19, W. 4th Mer.

Complete surveys, canal projections, and estimates of cost in this case show that almost 4,000 acres of land can be reclaimed here, at a cost of about \$9 per acre, by lowering the water-level some 5.71 feet. As less than 50 per cent of the area is Crown land, however, and as the resident owners are opposed to complete drainage, although strongly in favour of the partial drainage recommended by our engineers, this scheme is one for development by the resident owners under the provisions of the Alberta Drainage Act.

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Flat Lake, Tps. 55 and 56, Rges. 19 and 20, W. 4th Mer.

Our investigations show that this is a very attractive project, and complete data are available respecting it. By complete drainage, some 11,000 acres can be reclaimed from their present useless condition to valuable farm lands, at an estimated cost of about \$9 per acre.

Macleod River Valley, in the vicinity of Edson, Alberta.

Reconnaissance surveys throughout this district indicate that the muskeg and swampy areas, while including a large proportion of the total area, are so scattered and broken as to preclude the possibility of any comprehensive scheme, or schemes, being developed. This class of territory presents a distinct problem both as regards actual drainage and the treatment of the soil after drainage, since the water-covered or water-soaked soil consists largely of peat or moss underlain by clay, which in its present condition, both before and after drainage, gives little promise of usefulness unless it has been properly treated by burning, manuring, or other means of improving its physical and chemical properties.

Future development in this district will, therefore, be slow and depend largely upon the efforts of individual settlers who wish to add to their present holdings and gradually reclaim and improve small areas adjacent thereto. Numerous applications are being received to reclaim and purchase such small areas, and it would appear that every encouragement and all possible assistance should be given to these settlers. Many experiments will be necessary before the best methods of dealing with this class of soil after reclamation are discovered, and it is now being urged that the Federal Government assist to this end by the establishment of an experiment station, or farm, on some of the typical muskeg or peat lands. Considering the vast areas of this class of land throughout Canada—not only in the western provinces but also in Ontario and Quebec—experimental work along these lines would be well justified and would richly repay the expenditure, should proper methods of treatment be discovered and demonstrated.

Experimental work with this class of soil has been, and still is, carried on in some of the Central Northern States of the Union, and in many instances has been highly successful in forming some of the richest farm lands.

Winagami and Kimiwan Lakes, Tps. 76, 77, 78, and 79, Rges. 18, 19, and 20, W. 5th Mer.

Reconnaissance surveys in this district show that approximately 23,000 acres of land are susceptible of drainage at reasonable cost. The water supply situation may render it advisable to consider only partial drainage for Winagami lake. Complete surveys are being undertaken this year to develop the possibilities of this scheme.

East and West Prairie Rivers, west of Lesser Slave Lake.

Numerous complaints from settlers, with pleas for assistance in handling this problem, resulted in an investigation being made into the situation last season. After a careful survey our engineer found that the cost of remedial measures was very high, and that, since the flooded lands were largely in the hands of private owners, this project could not be undertaken by the Federal Government under the existing laws. Reasonably complete data regarding the necessary diversion of these two rivers to overcome the blocking of their channels by logs and debris were obtained, and reports and plans concerning this project are available.

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Sullivan Lake, Tps. 34, 35, and 36, Rges. 14 and 15, W. 4th Mer.

A reconnaissance survey was made of this project, which appears to justify further investigation with a view to full development of this scheme. This is a matter, however, which depends upon the result of the soil analyses, since it hinges largely upon the quality, and alkali content, of the soil, rather than upon the engineering features of the project.

SASKATCHEWAN.

Waterhen Lake, Tps. 44, 45, and 45A, Rges. 21 and 22, W. 2nd Mer.

This project was surveyed, in a preliminary way, during the fall of 1918, and completely surveyed during the season of 1919. Final canal locations were staked out and estimates of cost, and assessments of benefits, made.

Under the plans finally adopted, some 13,900 acres of land will be reclaimed, at an estimated cost of about \$11 per acre. The analyses of soil samples taken at representative points throughout the area indicate that, while there is a certain percentage of "alkali" present, this will not be deleterious to plant growth. But, on the other hand, the high nitrogen content of the soil gives promise of great fertility and indicates a soil which should produce excellent crops after it has been worked and aerated for one or two years.

All the formalities required in erecting this drainage district have now been complied with, and tenders are being called for the construction of the works.

Ponass Lake, Tps. 37, 38, 39, and 40, Rges. 14 and 15, W. 2nd Mer.

The area surrounding this project forms a first-class farming district, but is badly cut up with small lakes and sloughs, making travel difficult and retarding development. In addition to this, considerable areas of ordinarily good farm or hay lands are inundated during high-water periods, and, as a result, there have been numerous requests that some remedial measures be undertaken.

The field-work on this scheme last season was conducted along the same lines as that in the Waterhen project, and it was found that some 23,000 acres could be reclaimed at an average cost of approximately \$16 per acre. This comparatively high cost is due, partially, to the fact that the lakes and marshes are scattered and irregular, necessitating the construction of an elaborate system of collecting ditches. The survey conducted last season was carried to an outlet in Quill lakes, and the length and depth of the canal necessary added materially to the high cost of the whole project.

Further surveys are being made this season in an endeavour to find a shorter outlet to the north and west, and it is hoped that some feasible scheme can be worked out along these lines which will materially reduce the cost of construction.

Moose Range District, Tps. 49 and 50, Rges. 11, 12, 13, and 14, W. 2nd Mer.

Reconnaissance surveys were carried on throughout this district over a period of two months, and sufficient levels were run to determine that the scheme was feasible and could be cheaply constructed.

This project is one of the most promising yet investigated, and the survey showed that from 75,000 to 100,000 acres of high-class farm land can be reclaimed at a very moderate cost, while the proposed construction of one, or possibly two, new railways through the district adds greatly to its possibilities.

During the past year numerous applications have been received from returned soldiers to be allowed to enter for lands in this district, but the reports of our engineers show that it will be unfair to the applicants themselves to accede to such requests, since the land, without drainage, is practically useless.

Complete surveys of this project are being undertaken this season.

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Carrot River Triangle, lying between the Carrot and Saskatchewan rivers, and the Sipanok channel.

This project consists of a partially submerged area of 730,000 acres, which is periodically overflowed by the flood waters of the Saskatchewan river. Reconnaissance surveys have been made previously by the Water Power Branch of this department, and a short reconnaissance was carried out during the past winter by this Service. Sufficient information is now available upon which to base plans for the best methods of carrying on complete surveys.

MANITOBA.

Three investigations were carried on in the province of Manitoba at the request of the Soldier Settlement Board, and one at the request of the settlers in the district effected.

DAUPHIN AND OCHRE PROJECT, NEAR DAUPHIN.

The settlers of this district requested that the Federal Government undertake surveys to determine the cause of the flooding of their lands and the best methods of overcoming this difficulty. Our investigation showed that the overflow upon the lower farm lands was due to the natural run-off from the Riding mountains, owing to the fact that the streams flowing out of these mountains flattened out in grade upon reaching the plains and, during flood periods, overflowed their banks and flooded the adjoining farm lands.

Levels were run throughout the area affected, and alternative schemes were suggested whereby the interested municipalities might overcome the troubles resulting from this natural overflow.

Swan River, Tps. 32, 33, and 34, Rges. 21, 22, and 23, and Tps. 35, 36, and 37, Rges. 22, 23, 24, and 25, W. Pr. Mer.

Of this large area of approximately 700 square miles, all of which is more or less swampy, some 200 square miles were found to have soil of a quality suitable for agriculture. This area could be drained cheaply, but it is very largely wooded, and approximately 75 per cent of the land would require a considerable expenditure for clearing. Under these conditions, further investigations or operations cannot be recommended at the present time.

Mantagao River Project, Tps. 28 to 31, Rges. 3 and 4, W. Pr. Mer.

This project involves a large area, but the major portion of it proved to be land of little value for agricultural purposes after reclamation. Some 19,000 acres were found which would be of value for agriculture after drainage, and which could be drained for about \$12.50 per acre. Owing, however, to its distance from railway facilities, and to the growth of timber and moss on the land, it is not recommended for further development at present.

The Brokenhead River Project, Tps. 9 and 10, Rges. 8 and 9, E. Pr. Mer.

In the valley of the Brokenhead river lies some 90,000 to 100,000 acres of marsh land, either open or lightly timbered, which our somewhat detailed surveys indicate can be reclaimed at a cost of between \$4 and \$5 per acre. The soil, while not of the best agricultural quality throughout, is excellently adapted to the growing of hay, and, owing to the close proximity of the district to the city of Winnipeg, it offers excellent opportunities to stock raisers and feeders, especially the latter. Unfortunately, however, the greater part of this area has been disposed of to private parties, and, unless arrangements can be arrived at whereby transfers may be effected, no further action by the Federal Government can be recommended.

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PROVINCIAL DRAINAGE PROJECTS.

Drainage districts are organized under the provisions of the Drainage Acts of the various provinces, upon petition by at least two-thirds of the resident owners of land effected. Where more than 50 per cent of the land involved has become alienated from the Crown, the Federal Government, by reason of the Dominion Government Regulations, may not proceed with drainage, and in this case the initiative rests with the settlers. As, however, the control of all water areas is vested in the Crown, in the right of the Dominion, plans of the scheme are required to be filed in this department, and an investigation by one of the engineers of the Reclamation Service is required before the department's approval thereto may be granted.

The following provincial drainage schemes under this head were inspected in 1919:—

Alberta—

- District No. 6—authorized August 20, 1919.
- District No. 7—authorized October 1, 1919.
- District No. 8—authorized January 20, 1920.
- District No. 4—authorized January 22, 1920.

Saskatchewan—

- District No. 17—authorized September 19, 1919.
- District No. 13—authorized October 6, 1919.
- District No. 15—authorized November 28, 1919.

PRIVATE DRAINAGE PROJECTS.

Small drainage schemes under Part I of the Reclamation Acts and Drainage Regulations inspected, or investigated, in 1919 numbered thirty-four. Two large schemes, commenced prior to the passing of the Reclamation Acts, were also inspected in 1919, viz: the Low Water and Kleskun Lakes Projects.

During the winter and spring months of 1919-1920, 63 applications for drainage privileges under Part I of the Reclamation Acts and Drainage Regulations were received, and of this number 31 will be investigated this season; 15 applications were cancelled, 6 as the result of the investigations proving the schemes to be undesirable, and 9 before the investigation stage had been reached, either voluntary or because the preliminary requirements of the department were not carried out.

Increased interest is being shown throughout the "North Country" regarding the important question of drainage, and the engineering staff is being greatly taxed to keep up to the work required, especially in connection with the inspections for private schemes, involving the reclamation and purchase of Crown lands or the reclamation of wet areas within the applicants' holdings.

A number of new drainage districts are in process of formation, and, as the public becomes better acquainted with the machinery now in operation in connection with drainage applications, there is little doubt that the rate of increase in such applications will be materially greater.

During the past winter and spring the snowfall and run-off throughout Northern Alberta, Saskatchewan, and Manitoba were abnormal, and reports of flooding and requests for drainage more frequent in consequence. In the majority of cases the applicants are ignorant of the proper procedure and considerable correspondence is necessary before such applications are in shape, but it is believed that the carrying through of a large number of projects in the various districts will soon result in

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acquainting the settlers throughout the "North Country" with the necessary procedure. As a consequence, a large increase in the number of applications to carry on such work is expected.

INTERNATIONAL WATERWAYS TREATY.

The division of the waters of the St. Mary and Milk rivers during the past season was again carried out under the provisions of an interim order made by the International Joint Commission, pending a final decision on this important matter by that body.

The flow in these streams and their tributaries during the irrigation season of 1919 was the lowest on record, and the demand for water for irrigation purposes was the greatest yet experienced, both in the valley of the Milk river in Montana and in the Alberta Railway and Irrigation Company's tracts in Alberta. As a consequence of this combination of circumstances the water supply was insufficient to fulfil all demands upon it, but, on the whole, it may be said that the irrigated areas depending upon the main streams for their supply did not suffer seriously. The ever-increasing demand for irrigation indicates, however, that serious complications may arise during any year, but it is hoped that some final decision and adjustment may be arrived at in the near future.

PART V.

DOMINION WATER POWER BRANCH.

REPORT OF THE DIRECTOR OF WATER POWER.

J. B. CHALLIES, C.E. (Tor.), M.E.I.C.

The report of the Dominion Water Power Branch for the fiscal year ending March 31, 1920, covers a period of marked expansion in its activities. The return to the staff of those members who had been on overseas service permitted the resumption of important field activities which had been more or less curtailed during the war, while revised agreements with the Maritime Provinces, and a new agreement with the province of Ontario covering a co-operative investigation of water-power resources, further enlarged the scope of the general investigatory work.

ORGANIZATION AND SCOPE

The activities of the branch are both administrative and investigatory. The administrative phase of the work arises from the proprietary interest of the department in the water-power resources in the provinces of Alberta, Saskatchewan and Manitoba, the Northwest and Yukon Territories, and in the Railway Belt of British Columbia. In this connection the branch must of necessity secure such fundamental engineering and economic data as will enable the department to consider applications for power privileges, and to control the development, the distribution and the sale of hydro-electric energy. Systematic power investigatory work is accordingly carried on directly by the branch throughout this territory. This is the prime responsibility of the branch.

Throughout the balance of the Dominion the water-powers are vested in the provinces and investigatory work is carried on in co-operation with the respective provincial authorities charged with their administration. The branch also co-operates extensively with federal departments other than the Department of the Interior, the services of its engineering field staff, in the interests of general economy and efficiency, being made available to such other departments.

The object of the direct and co-operative investigatory work is two-fold, i.e., to co-ordinate and systematize the gathering of power and general water resources information from coast to coast; and to create a centralizing agency for the efficient analysis of the power and general water resources of the Dominion in relation to location and use of power; to industry; to industrial centres; industrial opportunities; transportation systems—rail and navigation; mineral resources; timber resources; coal and fuel supplies; electro-chemical and electro-metallurgical opportunities; irrigation, drainage and reclamation projects; alternative sources of power; and to use of and market for power in general; and to compile the material into immediately available and usable form and for whatever purpose required.

CO-OPERATION

For the proper and efficient carrying out of its administrative and investigatory policies, the branch has a trained staff of officers, the greater number of whom are engineers who have been specially trained in the various phases of power investiga-

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tion and analysis. In addition to this organization the branch through co-operative agreements and harmonious personal relationships works in intimate and direct co-operation with the provincial power authorities. The branch has in this manner practically effected a consolidation of federal and provincial investigatory effort in respect to the determination and analysis of water resources data. This co-operation and the facilities for effective work through the Dominion are briefly listed.

In British Columbia the Dominion Water Power Branch, under a co-operative agreement with the local British Columbia Water Rights Branch, carries on a broadly-planned hydrometric survey and systematically secures fundamental data necessary to a complete analysis of the water-power resources. In the three Prairie Provinces the administration of the water resources is wholly under the control of the Federal Department of the Interior. The local staff of the Dominion Water Power Branch headquartered in Winnipeg maintains a systematic and exhaustive field and office analysis of the water-power resources of the three provinces. A comprehensive hydrometric survey is maintained throughout the province of Manitoba. In Alberta and Saskatchewan similar hydrometric investigations have been carried on for a number of years by the Reclamation Service, which, within the next few months by a readjustment of the responsibilities of the respective organizations concerned, will be transferred to this branch. In Ontario, the branch, under the terms of a co-operative agreement with the Ontario Hydro-Electric Power Commission, carries on a broadly-based hydrometric survey and systematically secures fundamental water resources data. While no formal agreement has been entered into with the province of Quebec, harmonious relationships have been established with the provincial authorities and with the Quebec Streams Commission under which there is a free interchange of data and through which a co-operative analysis of the provincial water-power resources is proceeding. In the Maritime Provinces the branch, under a co-operative agreement with the three respective provincial governments has established a systematic hydrometric survey covering all the principal power rivers and streams and is carrying on continuous field investigatory work with a view to the securing of all fundamental data necessary to a complete analysis of the water-power resources.

DOMINION POWER BOARD

As noted in last year's report, the above board was originally established in April, 1918, as an engineering consultative and advisory body to the Dominion Government. The personnel has been added to from time to time since it was first formed, and now is as follows, viz:—

- The Minister of the Interior, Hon. Arthur Meighen, K.C., M.P., Chairman.
- Mr. Arthur St. Laurent, Assistant Deputy Minister, Department of Public Works, Vice-Chairman.
- Mr. H. G. Acres, Chief Hydraulic Engineer, Hydro-Electric Power Commission of Ontario.
- Mr. Arthur Amos, Chief Engineer of the Hydraulic Service of the province of Quebec.
- Mr. W. A. Bowden, Chief Engineer, Department of Railways and Canals.
- Dr. D. B. Dowling, Geologist, Mines Department.
- Mr. J. B. Challies, Director of Dominion Water Power Branch, Department of the Interior (secretary).
- Mr. B. H. Fraser, Chief Engineer, Marine Department.
- Mr. B. F. Haanel, Chief Engineer, Fuel Testing Division, Mines Department.
- Mr. O. Higman, Chief Electrical Engineer, Department of Trade and Commerce.
- Col. C. N. Monsarrat, Consulting Engineer, Department of Railways and Canals.
- Mr. John Murphy, Electrical Engineer, Dominion Railway Commission.
- Mr. W. J. Stewart, Consulting Engineer, Department of External Affairs.

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During the year various investigations and reports have been made on certain special questions by different members of the board, viz.:—

Electrical Export of the Canadian Niagara Power Company, the Toronto Power Company, and the Ontario Power Company, Mr. Higman.

Gasolene content of Western Canada natural gases, Dr. Dowling.

Proposed steam-electric generating and distribution system for southern Saskatchewan, Mr. Haanel.

In addition to the above the board has been keeping in touch with all United States proposals regarding the fuel and power situations, suggested canal constructions, water diversions, etc., etc., in which Canada is actively or prospectively interested, besides which a compilation is being made of all the available data, past and present, as to the levels and flow of the St. Lawrence. This work, which is under the direction of Mr. A. J. Matheson, the hydraulic engineer of the board, is in preparation for the investigation that is to be made as to the cost, feasibility, etc., of the deep-water canalization and power development of that river.

The board has also been asked to report upon the request of the Hydro-Electric Power Commission of Ontario that the Dominion Government reimburse it for certain power plant and other expenditures made during the war that it is claimed are properly a charge upon the country as a whole rather than upon any one section thereof, which matter is now under consideration.

THE LAKE OF THE WOODS CONTROL BOARD.

The Lake of the Woods Control Board created by Order in Council on January 21, 1919, in accordance with the recommendations of the International Joint Commission, has, during the past year, been responsible for the control of levels and outflow of lake of the Woods.

The personnel of the board consists of the following federal and provincial representatives: W. J. Stewart, Chief Hydrographer of the Naval Service, and J. B. Challies, Director of Water-power for the Dominion of Canada, and H. G. Acres, Hydraulic Engineer of the Hydro-electric Power Commission of Ontario, and L. V. Rorke, Director of Surveys, Department of Lands, Forests and Mines for the province of Ontario.

Regulation of the lake has been carried out along similar lines to those pursued by the Dominion Water Power Branch, when acting in an advisory capacity to the province of Ontario, a complete description of which has been given in previous reports.

During the past year practically no draught has been made upon the full reservoir in the lake though the outflow never fell below 9,500 second-feet. As a result of abnormal precipitation between June 22 and July 3, lake inflow reached the unprecedented rate of 125,000 second-feet, or nearly double the previous recorded maximum of 73,000 second-feet. Prompt action enabled the board to successfully cope with the situation and lake level after a sudden rise from elevation 1,060.0 to 1,061.9 was rapidly drawn down again to the former elevation.

For the recording of fluctuations in lake and river level, the board has secured two automatic gauges, one of which has been installed in the lake at Kenora. The second is to be installed during the ensuing open season in the Winnipeg river immediately below the lake outlets.

Action has also been taken by the board to secure if possible an efficient motor-driven winch for the manipulation of stop logs in the Norman dam.

NEW DOMINION WATER-POWER ACT.

In last year's annual report mention was made of the preparation of a Water-power Bill to take the place of section 35 of the Dominion Lands Act. This Bill has

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since become a law, and is known as "The Dominion Water-power Act" (Chap. 19, Statutes 1919).

This Act affords the basis for the administration of all water-powers on lands of the Dominion which have been or may be placed under the control and management of the Minister of the Interior. It declares all such water-powers to be vested in the Crown, and provides that rights to develop and utilize the same may be acquired only by license under regulations to be adopted. Every undertaking carried on in pursuance of the Act is declared to be a work for the general advantage of Canada; and private lands which are required for the purposes of any such undertaking may be expropriated.

The minister is empowered to carry on surveys and investigations with respect to developed and undeveloped water-powers not only for the purpose of determining the total utilized and available water-power, but also to be in a position to furnish information with respect to the nature and probable utility of individual water-powers.

Specific provision is made for a director of water-power who must be a duly-qualified officer and under whose supervision and control all administrative and investigatory work in connection with water-powers must be carried on.

Ample power is given to the Governor in Council to establish regulations governing all the details of administration during the survey-construction period as well as throughout the period of operation of the completed project.

REGULATIONS AND LEGAL RESEARCH.

The study of water-power legislation and administration in all countries, which has been carried on during the past few years in the Dominion Water Power Branch, has been continued. During the last six months of the year the services of a technical translator have been secured, and the water-power legislation of France, Italy, Sweden, Norway, Switzerland, Austria, Germany, Spain and Portugal has been translated and studied.

The conferences composed of technical, legal and administrative members of the staff to devise and report upon suitable regulations under the Dominion Act have also been continued. A very complete report covering the entire field of water-power administration (report No. 310), and a preliminary draft of regulations, prepared by H. W. Grunsky, Legal Adviser, Dominion Water Power Branch, were used as a basis for the work of these conferences.

As the conference took up each subject in turn, the regulations were revised in accordance with decisions arrived at, and a complete redraft embracing the conclusions of the conference is now about completed, and will, no doubt, be submitted for the approval of the Governor in Council during the coming year. The field covered by these regulations is briefly as follows:—

1. The application;
2. Publication and local hearing;
3. General layout plans;
4. Priority permit;
5. Interim license;
6. General construction plans;
7. Guarantee deposit;
8. Inspection and reports;
9. Final construction plans;
10. Fixation of construction costs;
11. Time limit for completion;

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12. Final license—

- (a) Term,
- (b) Renewal conditions,
- (c) Compensation for works and lands if license terminated.—
 - (i) Within the severance line,
 - (ii) Without the severance line;

13. License rentals;

14. Care of lands;

15. Maintenance of works;

16. Power output clauses;

17. Power sale clauses;

18. Stream regulation and control clauses;

19. Accounting;

20. Regulation of rates to consumers, stock and bond issues, and non-capitalization of grants;

21. Transfers;

22. Penalties for default;

23. Small water-powers.

In addition to the general report above mentioned, two other reports, covering the whole field of water-power legislation, have been prepared. The first of these, report No. 379, consists of a compilation of the water-power laws and regulations in force in other countries, including translations from the legislation of all the leading countries of Europe where water-power resources form an important item. The second, report No. 342, is a discussion of twenty or more contentious questions which must be considered in framing suitable water-power regulations.

BRITISH COLUMBIA WATER-LANDS REGULATIONS.

In the Railway Belt in British Columbia the waters outside Dominion parks, which belong to the Dominion, are administered by the provincial authorities under their water Acts, and in order to enable those who have been granted water privileges in the province to have access to the Dominion lands which are required by them in the exercise of their rights, certain regulations, known as the British Columbia Water-Lands Regulations, were passed by Order in Council in June, 1918, having that end in view.

These regulations are now becoming better known to applicants for water privileges, and the department is thus enabled to safeguard the rights of the owner or occupier of the land on the one hand and the user of the water on the other.

The general principles underlying these regulations are, that application for a water privilege and application for the lands required in connection with it should be made at the same time, so that during the interval required by the provincial authorities before granting a water license the land which will be required by the applicant in carrying out his works may not be disposed of in such a way as to prejudice his prospective rights; and, after the water license has been issued, to grant the licensee only such rights of access and occupation as are necessary to him, thus making the land permit complementary to the water license.

The Water Rights Branch of the Provincial Government gives every assistance in carrying out the regulations, and supplies full information regarding all water privileges applied for or granted which affect Dominion interests. During the year, notification was received of about two hundred and fifty water licenses granted within the Railway Belt and thirty-five applications were made for an interim permit under the Water-Lands Regulations.

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WATER RESOURCES INVENTORY.

The water resources inventory for the filing, recording and analysing of water resources data, the basis and purpose of which was explained in detail in the last annual report, has been broadly developed and applied during the past year, both in head office and in the field offices, the practical application of the system has greatly increased the efficiency of our analytical investigatory work. All water-power and cognate data, whether secured directly through the activities of the branch or in co-operation with other organizations, is referenced, analysed, and where possible standardized, and filed available for further detailed analysis in relation to the uses of, or market for, power in general.

During the past year, the systematic analysis of the water-power resources of the Dominion has proceeded in accordance with the principles of the inventory. Following the co-operative agreement with the Hydro-Electric Power Commission of Ontario, a complete analysis of the undeveloped water-powers of Ontario was commenced in full co-operation with the commission's officers. This analysis is proceeding in a most satisfactory manner. In co-operation with the British Columbia Water Rights Branch of the Provincial Government a similar analysis is being made of the British Columbia water-powers. In the other provinces similar work is proceeding and during the coming year a considerable proportion of water-power resources data of the Dominion will be available in standardized and usable form whenever and for whatever purpose required.

The complete census and analysis of developed water-power and of the central electric station activities throughout the Dominion, referred to under separate headings, has been tied in all phases to the inventory system. Similarly, all stream measurement activities and storage studies have been referenced and standardized.

The fact that various federal and provincial departments have adopted the system has greatly facilitated the interchange of water resources information. This is a feature, the value of which will be appreciated more and more as the principles of the system are more widely adopted.

CENSUS OF CENTRAL ELECTRIC STATION INDUSTRY.

The second analytical report of the census of central electric stations in Canada has recently been completed by the Dominion Water Power Branch in co-operation with the Dominion Bureau of Statistics. The census includes all stations which distribute or sell electrical energy for lighting, heating or general power purposes and excludes industrial organizations developing electrical energy as primary power for their own direct use. The results of the census provide convincing evidence of the extensive development of one of our most fundamentally important industries, and indicate that Canada's water-power resources have been a unique factor in such development. While the report just completed provides definite data relative to the development of the central electric station industry yet a true realization of its vital importance to domestic, industrial and commercial life can only be obtained when the industry is considered in conjunction with the multitudinous interests dependent on the electrical energy supplied.

The total capital invested in central electric stations is \$401,942,402, of which commercial or privately owned stations reported 71.7 per cent, and the municipal or publicly owned stations 28.3 per cent. The total capacity of primary power machines is reported as 1,958,642 horse-power, of which 1,841,114 horse-power represents the installation in principal plants and 117,528 horse-power the equipment of auxiliary or stand-by plants. Of the total capacity of primary power equipment the commercial stations reported 77.9 per cent, and the municipal stations 22.1 per cent. The capacity of the water-wheel or hydraulic turbine installation is given as 1,682,191

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horse-power, or 91.4 per cent of the total capacity of all primary power machines in the principal stations; the steam reciprocating engines and steam turbines 146,637 horse-power, or 7.9 per cent; and the internal combustion engines 13,286 horse-power or 0.7 per cent.

The report is complete to January 1, 1919. The statistics are given by provinces as well as for the Dominion as a whole and are so divided as to provide separate data for publicly owned and privately owned stations and for stations deriving their power from water and from fuel. It is being published by the Dominion Bureau of Statistics. Copies can be obtained by application to the Bureau or to the Dominion Water Power Branch.

CENSUS OF DEVELOPED WATER-POWER

An exhaustive census and analysis of the developed water-power in Canada was completed during the year by the Dominion Water Power Branch in co-operation with the Dominion Bureau of Statistics. The figures, which are complete to January 1, 1920, are exceptionally interesting and are indicative of the marked manner in which the water-power resources of the Dominion are being put to advantageous use.

According to a recent computation the water-power resources of the British Empire have been placed at from fifty to seventy million horse-power. This does not include such territories, formerly under control of the Central Powers, as will fall in future under British influence. To this total Canada contributes in the neighbourhood of twenty million horse-power. This figure represents the power available at sites at which more or less definite information is to hand. Continued investigation will undoubtedly add to this figure.

According to the statistics just compiled there is installed throughout the Dominion some 2,418,000 turbines or water-wheel horse-power of which 2,215,000 horse-power is actually and regularly employed in useful work. The larger figure includes the total installed capacity at full gate, including reserve units. It does not, however, include hydraulic exciter units. A large number of the plants now operating are designed for the addition of further units as the market demands. The ultimate capacity of such plants, together with that of new plants now under construction, total some 3,385,000 horse-power.

Of the total power installed on January 1, 1920, 1,756,791 horse-power, or 72.7 per cent, is installed in central electric stations, and is distributed for sale by these stations for lighting, mining, electro-chemical, electro-metallurgical and general manufacturing. It is apparent, therefore, that the central electric station total includes a portion of the totals used in other industries. The returns show a new installation in central electric stations of 74,600 horse-power placed in operation during the year 1919. In the pulp and paper industry 473,265 hydro horse-power is utilized, of which 381,631 horse-power is installed in pulp and paper establishments while 91,634 horse-power is purchased from hydro central electric stations. Hydro-power installed and used for other purposes and other industries may be listed as follows: For lighting purposes, 434,613 horse-power; in mining industry, 177,728 horse-power; in flour and grist mills, 42,736 horse-power; in lumber and saw-mills, 37,918 horse-power; in other manufacturing industries, 172,955 horse-power. These figures are evidence of the widespread manner in which the Dominion's water-power resources are being applied to the furtherance of its industrial development. In further reference to the foregoing total of water-power developed in Canada, it might be noted that during the fiscal year ending March 31, 1919, there were exported from plants included in tabulation, 175,000 horse-power years.

With a water-power development of 274 horse-power per thousand population, Canada stands well in the forefront in respect to availability and utilization of hydro-power resources, being only surpassed in this respect by Norway. The great water-

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power resources still untouched form a substantial basis for the progressive exploitation and development of other natural resources, and, if properly co-ordinated with the development and utilization of the enormous fuel reserves of the Dominion are an assurance of continued industrial expansion and prosperity.

HYDROMETRIC SURVEY

Regular stream measurement operations have been carried on during the year in the provinces of British Columbia, Manitoba, Ontario, New Brunswick, Nova Scotia, and Prince Edward Island. During the past year the department, through a co-operative agreement with the Hydro-Electric Power Commission of Ontario, took over the hydrometric work in that province, and by agreement with the provincial authorities instituted similar work in Prince Edward Island. The scope of the hydrometric work carried on by the department was thereby greatly enlarged. Nevertheless, in consequence of the organization already in existence for the carrying on of such work, it has been possible to assume the increased responsibilities with a very moderate increase in staff. At the present time, negotiations are proceeding with the Reclamation Service looking to the release to this branch of the Hydrometric Survey work hitherto carried on by the Reclamation Service in the provinces of Alberta and Saskatchewan. This will place all hydrometric work of the department under one central control and permit the realization of maximum efficiencies in organization and maintenance of field operations.

Activities of the Hydrometric Survey in British Columbia have been continued under the direction of Mr. R. G. Swan as district chief engineer in co-operation with the provincial authorities as outlined in previous reports. During the year there were maintained 158 stations at which regular meterings were obtained and 33 stations at which only occasional meterings were secured. Special flow studies were carried out in the Okanagan Valley for the provincial Water Rights Branch and in the Lower Fraser river for the Department of Public Works. Surveys were carried out in the Indian reserves of the Lytton, Kootenay and Kamloops agencies to assist the Department of Indian Affairs in the proper establishment of water rights appurtenant to those reserves. Attention was also given to numerous applications received by the Dominion Lands Branch for the purchase or lease of lands in the province.

In Manitoba the stream measurement work has been continued throughout the year under the direction of Mr. C. H. Attwood as district chief engineer. There were maintained during the year thirty-six stations at which regular meterings were obtained, fourteen stations at which occasional meterings were obtained and twenty-six stations from which gauge records only were obtained. For reasons of efficiency and economy, the work was extended to include hydrometric investigations in Ontario, west of and including the Nipigon river, upon the department assuming responsibility for work in that province.

Pursuant to the terms of the co-operative agreement with the Hydro-Electric Power Commission of Ontario, this department assumed responsibility for the carrying out of all hydrometric survey and fundamental investigatory work in the province and the work was placed under the direction of Mr. S. S. Scovil as district chief engineer. Some sixty regular stream measurement stations have been maintained, and, in addition, miscellaneous meterings were obtained on a number of streams.

A new co-operative agreement was entered into during the year with the three Maritime Provinces, New Brunswick, Nova Scotia and Prince Edward Island. Under the terms of the agreement the work was consolidated to include all three provinces, and the department assumed responsibility for the carrying out of all general basic investigations, including hydrometric survey. The work was placed under the direction of Mr. K. H. Smith as district chief engineer.

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During the year, fourteen regular stream measurement stations were maintained in New Brunswick, twenty-one in Nova Scotia, and seven in Prince Edward Island. In addition, co-operation was maintained with the Canadian Meteorological Service in the maintenance of precipitation and evaporation stations.

POWER AND STORAGE SURVEYS

The augmentation of the field staffs due to the return of members who had been serving overseas enabled the department to resume power investigatory work in the field, which had been greatly curtailed during the war years. Office studies with regard to the analysis of water-power possibilities throughout the Dominion have been continued throughout the year.

In British Columbia in addition to the collection of fundamental stream-flow data, a thorough inventory and analysis of the water-power resources of the province has been commenced.

In Alberta an inspection of the Bow Falls power site was made and an investigation of the general power market conditions in Calgary and vicinity. An exhaustive report was prepared and presented to the provincial authorities analysing the power possibilities of the various power rivers throughout the province.

In Saskatchewan a reconnaissance power and storage survey was made of the Sturgeon-weir river, together with a detailed survey of the Birch Rapids power site on the same river. This survey was of immediate importance in connection with the development of the mineral area in northern Manitoba. A very complete report was prepared and presented to the provincial authorities covering the principal features of the various power rivers of the province along similar lines to the report of the power rivers of Alberta.

In Manitoba a reconnaissance power survey was made of the Wanipigow river, flowing into lake Winnipeg from the east and adjacent to the Rice Lake mining district. A detailed survey and report was made of the Whitemud Falls power site on the Nelson river. A survey was made of the power possibilities of a site at Stockton, on the Assiniboine river, at the request of the Manitoba Power Commission. Direct supervision was also maintained over the construction activities of the Winnipeg River Power Company at du Bonnet falls (sometimes called Great falls) on the Winnipeg river.

In Ontario this department, in co-operation with the Hydro-Electric Power Commission of Ontario, has in course of preparation a very thorough inventory and analysis of the developed and undeveloped water-power and storage resources of the province.

In New Brunswick power and storage surveys were carried on throughout the year on the Tetegouche, Shogomoc, Pokiok, Eel, and Lepreux rivers. Developments on three of these rivers are projected for the near future to supply the cities of St. John, Fredericton, and Bathurst.

In Nova Scotia power and storage surveys were carried out on the Nictaux river, Bear river, Bear river East Branch, Bear river West Branch, Sissiboo river, and Tusket river. The Meteghan River surveys were commenced and will be completed during the forthcoming season.

In Prince Edward Island power and storage surveys were postponed until the stream measurement work had been brought well under way.

DOMINION LAND SURVEYS AND RECLAMATION.

Dominion land surveys of overflowed lands as affecting the administration of water-power were carried on throughout the year under the direction of Mr. T. H. Dunn, D.L.S.

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Operations were confined to the determination of flooded lands along the Winnipeg river in connection with the developed and undeveloped power sites. This work was rendered necessary as all of the unpatented lands adjoining the river had been reserved by sections and quarter-sections for water-power purposes, resulting in the withholding from settlement not only of such lands as would be required in the development of power but also certain lands not affected by the power developments. The persistent demand from squatters and others for entry on these lands under the homestead laws made it imperative that a survey be made for the purpose of setting aside and accurately describing the portion of each section required for power purposes.

The season of 1919 was spent on that part of the Pinawa channel of the Winnipeg river extending north from the Pinawa power plant to lac du Bonnet. In addition to traversing the boundaries of the area to be reserved, a resurvey of all of the sections affected was carried on under instructions from the Surveyor General. Under the circumstances encountered a satisfactory season's work was accomplished, and during the forthcoming season the operations will be carried forward along similar lines.

Since the establishment of the Reclamation Service all purely reclamation work hitherto carried on in the provinces of Manitoba and British Columbia by this branch has been made a responsibility of the Director of Reclamation.

RESEARCH INTO THE UTILIZATION OF OFF-PEAK POWER.

Arrangements were completed during the past year for undertaking research work looking to the increased industrial use of off-peak power available in practically all central electric stations throughout the Dominion. Research, which will develop practical methods of utilizing the available installed capacity of central stations, is of particular interest to Canada, where over 91 per cent of the installed central station primary power is water-power. Maximum efficiency in the utilization of this water-power requires 100 per cent load factor, an ideal which is practically impossible to completely realize in practice. Every step towards this end, however, means a more efficient utilization of our water-power resources. Several promising lines of research are now under way in this connection.